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East Europe Report

ECONOMIC AND INDUSTRIAL AFFAIRS

No. 2435

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CONTENTS

PROGRESS OF DEBATE ON TAX BILL PRAISED, FAULTED

Nieckarz Press Conference

Warsaw TRYBUNA LUDU in Polish 17 Jun 83 pp 1, 5

[Article: "Minister Nieckarz on Taxes"]

[Text] During a press conference organized on June 16 Minister of Finance Stanislaw Nieckarz gave a report on the results of a "broad social consultation" concerning the draft of new tax system principles. The consultation lasted for 42 days because such a period elapsed from the press conference when these principles were presented. According to the estimation of the ministry, this time has been long enough to be sure that society was honestly questioned for its opinion on this very important problem.

The project caused a vivid social response, as proved by letters sent to the Ministry of Finance and the number of press publications. The view of the ministry is, however, that it is impossible to answer the letters from the citizens and there exists no necessity to assume an attitude towards the press statements because the authors of the draft were not interested in a public discussion but only in making a poll on opinions.

The results of this poll were, probably, in conformity with the wishes of the ministry, because most of the remarks are contradictory, as noticed by Minister Nieckarz. The farmers postulated, supposedly, higher taxes for craftsmen, the craftsmen for farmers, the workers for private enterprises in general and owners of vegetable gardens in particular (it is clear that the results of their work irritate the people and mainly the mothers of small children), etc. And all of them asked for privileges for themselves. It seems that the nature of the letters sent to the Ministry of Finance was very different from the content of letters received by the journals and published amply, i.e., by RZECZPOSPOLITA. Most of these letters did not contain any narrow-minded particularism nor denunciations on others but reasonable remarks that were, besides, in conformity with the press publications.

During his nearly 1.5 hour long speech Minister Nieckarz concentrated on justifying the thesis that the published draft is good enough, even the best one, and does not need, thus, any fundamental changes. But the authors came, however, to the conclusion that they can make some, most often requested, amendments. It was therefore decided to:

- exclude from the compensating tax computation basis the wages extras due to harmful working conditions and renumerations for inventions,

- modify the compensating tax tables in such a way that the first grade of overrunning the limit of 300,000 zlotys per year shall be divided into 3 grades. According to the first project, the tax for the surplus of yearly income up to 36,000 zlotys had to be 20 percent of this surplus. At present the Ministry of Finance decided to make a great concession and proposes that the tax shall be 10 percent of a surplus up to 12,000 zlotys; 1,200 zlotys and 15 percent of a surplus from 12,000 to 15,000 zlotys and 3,000 zlotys plus 20 percent of a surplus from 24,000 to 36,000 zlotys (there are no other changes--see ZYCIE GOSPODARCZE no. 20/1983,

- exclude from taxation the retirement and disability payments received by blind soldiers and former prisoners ff concentration camps,

- increase the income tax reduction due to export from 3 percent to 5 percent of the enterprise export turnover.

These are all the changes, if this word is at present the proper one, because what has been presented by Minister Nieckarz as the result of social consultations seems to be only a touch up of marginal problems.

It is the more true because both the citizens in their letters published by the press and the press itself sent in a number of remarks to the draft of the Ministry of Finance that were of a real fundamental nature from the economical and social point of view.

They referred, for example, to an increase of the free of tax amounts due to supporting by the tax payer children and not working spouse, to equalizing the free of tax income of employees (300,000 zlotys) and payers of income tax (160,000 zlotys), to a more pro-development determination of the formula for investment reductions, to a shift of the date of the bills coming into force to the beginning of 1984 or, finally, to taking into consideration in the structure of the system, at least, the official planned rate of inflation.

Unfortunately, none of these requests was fulfilled.

Negligible Impact of Public Debate

Warsaw ZYCIE GOSPODARCZE in Polish 26 Jun 83 p 9

[Article by Jan Markusz: "Projects of New Tax Principles Still Under Discussion. Results of the So Far Held Consultations"]

[Text] Exactly one month ago there were published the drafts prepared by the Ministry of Finance on the turnover and income tax relating to the handicraft and private trade and services, on the recompensating tax comprising the wages of socialized enterprises employees as well as the principles of a taxation reform concerning individual and socialized farms.

These drafts were submitted to a social consultation. Minister of Finance Stanislaw Nieckarz informed the journalists during a press conference in the Ministers' Council Office about the results of this consultation. A definite majority of the opinions and proposals--stated the minister of finance--is of a businesslike and quiet nature. The initial excitation of the interested individuals or groups gave very soon way to a cautious analysis of proposed solutions. There is no uniformity of the opinions and postulates, because it could not be expected. But it happens very often that they crisscross and exclude one another, depending upon the fact to which group--farmers, workers or craftsmen--the determined tax solutions are related. The Presidium of the Council of Ministers got acquainted with the results of the consultation.

A part of the postulates sent in under the consultation has been taken into consideration, a part did not and all the bills drafts are still being discussed. What specific changes are requested for the compensating tax related to persons employed in socialized enterprises?

Many requests refer to the so called exclusions. The draft of new principles tried to make their range as narrow as possible, but the participants of the consultation suggested the need for widening them, i.e. by the employment period benefits and export renumerations. There prevailed, however, the conception of keeping the so far in force exclusions from the compensating tax, as governmental and jubilee rewards as well as wages and benefits for the work on free Saturdays, Sundays and holidays. At the same time there is discussed the possibility of taking into consideration the extras for harmful working conditions and payments for being on duty to the medicine doctors in hospitals and ambulance service. There is also a proposal to exclude the disability payments received by blind soldiers and former prisoners of concentration camps. It is evident that, in accordance with the bill on inventions, the renumerations for inventions are excluded from taxation.

A lot of controversions was caused by the recompensating tax free amount. In the draft its limit was determined for 300,000 zlotys yearly, i.e. 25,000 zlotys monthly. According to the opinion of the minister of finance, the tax free amount should be considered, first of all, with the above-discussed exclusions and in particular those related to the payment for work on free Saturdays, Sundays and holidays. In the case of, e.g., miners this increases the tax free amount to approximately 40,000-42,000 zlotys monthly. It is proposed, thus, to keep the so far in force limit of the tax free amount, but the progression in the first few steps shall be essentially mitigated.

Instead of, e.g., 20 percent of the yearly income above 300,000 zlotys there would be only 10 percent over 312,000 zlotys and 15 percent at an income from 312,000 to 324,000 zlotys. The system of tax reductions would not be changed. The second group of postulates referred to the draft of taxation principles concerning craftmanship, privated trade, services and Polonia enterprises. It is proposed to keep the initial version, increasing the turnover tax rate from 6 percent to 10 percent, the same that is in force for the socialized sector. Its reduction, as requested by the craftsmen, under conditions of independent determining contract prices by the craftsmen enterprises for products and services would be in disagreement with the principles of social equity. The income tax free amount, called also in question by draftsmen, should remain unchanged, according to the opinion of the Ministry of Finance.

Otherwise, there would occur great disproportions between the incomes of those who do not have their own capitals nor hired workforce, live from the work of their hands and are charged, additionally, by the results of various taxes paid by enterprises they are working with, and those who are working exclusively on their own account. The possibilities for handicraft development are connected with numerous preferences and reductions, i.e., the reduction due to export was increased to 5 percent.

There still lasts a discussion on the new principles of farm taxation. The sent in postulates and opinions shall be analysed. In the meantime, the new taxation principles for handicraft are debated in Parliament commissions. As stated by Minister Stanislaw Nieckarz, the bill on recompensating tax, amended by the sent in postulates, shall be also handed over soon to the Sejim.

More essential changes shall apply to the Polonia and foreign enterprises. Speaking about this problem, Minister Nieckarz stressed the great aggressiveness concerning the proposed solutions from the side of interested circles and asked rhetorically if they would have such a same negative attitude towards a change of tax principles in their own country?

The modifications concerning taxation of Polonia enterprises amount, i.e., to the inactivation of the privilege of a 3 years exemption of income tax only in the case when they change the scope of their activity and the resignation of the principle that the highest tax for Polonian enterprises can not exceed 50 percent of their income.

The government will also propose new solutions in the domain of foreign currency privileges. So far, the Polonia enterprises disposed of all incomes from export and were obliged to sell half of the surplus to the Commercial Bank only in case of a foreign currency transfer. At present, it is proposed that the right of free disposal shall refer only to 50 percent of the export income surplus, after previous sale of the second half to the Commercial Bank.

12376
CSO: 2600/1067

BELCHATOW POWER PLANT NO 2 GENERATING UNIT COMES FULLY ON LINE

Warsaw TRYBUNA LUDU in Polish 21 Jun 83 pp 1, 5

[Article by Jan A. Kraszewski: "Belchatow Caught a Second Breath"]

> [Text] From the beginning of June of this year at the Belchatow power plant, two energy generating units of 360 megawatts each have been working at full strength. The second generating unit synchronized on 30 May of this year during the period of starting up has produced 200 million kilowatt hours of electrical energy while using 285,000 tons of brown coal from a nearby mine.

"Its workmanship," says the assistant director of the power plant for technical matters, Jan Tokarz, "is considerably higher than the first generating unit's." The collected experiences of the construction and assembly crews together with that of the producers of the mechanisms of this prototype construction contributed to it. They also caused that, starting with the second generating unit, the modernization of projects through introducing over 70 construction modifications was set about. Thirty-one were already initiated, and the whole process will be ended with the fourth generating unit.

The ambition of the engineers, builders and users is the achievement of the highest possible disposition of the Belchatow giant. In the course of 5 months of this year the first generating unit was supplying the country energy system for 88 percentage of the time. The next ones are to be still more efficient.

During the time of my stay in the huge engine room the second generating unit just then "jumped out." The reason was the too-great contamination of the proportioned coal. The electrical sensing devices immediately caught the "oversight" and shut down the work of the boiler. After a few minutes its work was synchronized with the country system.

Light for Four Million

Starting with the launching of the first generating unit, one of twelve that will rise in Belchatow, the power plant has produced 2.3 billion kilowatt hours of electrical energy. Some 720 of the megawatts of the present power, in simple

reckoning, enables the burning of 7,200,000 100-watt lightbulbs simultaneously. Allowing for seven in each dwelling, we gain the illumination of a million dwellings. It is possible to say then that around four million people use electrical current produced in this power plant. By another reckoning it is evident that it fully satisfies the needs of the million people of the Lodz area.

Up to now, 3,700,000 tons of Belchatow brown coal have been burnt in the two working boilers. For this year the mine will supply 5,200,000 tons, insuring completely the needs of the power plant. Together with the flow of time, its quality is growing, the amount of contamination is diminishing with the exploitation of deeper layers.

Third Generating Unit Still in This Year

The promotion of installation works is great. The body of the parts of the high- and medium-pressure turbine number 3 from Zamech of Elblag is already installed. The low-pressure part is in the process of installation. The installation of the generator, the work of the Wroclaw crew of Dolmel, is reaching its end.

The third boiler, which is partly insulated, is also nearing completion. The work continues on the external thermal insulation.

Together with Boguslaw Karwoski, the shift supervisor of the power plant, we are going to the fourth generating unit. The condenser and foundations under the fourth turbine are already installed. The installation of the fourth boiler is considerably advanced. The superheater and the external pipes were installed on that very day. Construction bearing the boilers number 5 and 6 are also rising.

Work on the building of the 130 meter chimney coolers is considerably advanced. The first is at work, and the installation of the internal fittings are being completed and they have begun on the third.

The foundation work under the second chimney has also been completed.

Acceleration in 1985

"Next year in September the activation of the fourth generating unit is planned, in 1985, in February, July, and December, the next three. Such an acceleration will be possible, because deliveries are proceeding efficiently," says the assistant director for economic matters Roman Kudla. "We have confirmed deliveries for further years in advance, which does not mean that we do not have our problems."

The greatest difficulties appear in the anti-import productions. Energomontaz-Polnoc ought to increase its technical performance. The too-small number of workers causes work to go on in practice for only one shift.

At the Belchatow construction site in the mine and the power plant today over 20,000 people are working. Without a doubt there are too few of them.

They do not have it easy, especially after returning to their homes. The secretary of the KZ [Works' Committee], Tadeusz Bawarski, informs about the infrastructure of the city of Belchatow continually remaining in the rear behind the main investment. "If the building of dwellings got underway, it was probably at the cost of schools, preschools, commercial and service buildings," he says.

The builders of Belchatow critically evaluate the health service, and especially the lack of doctors. This was spoken about recently during the proceedings of the plant party organization. The secretary being a member of the central committee of the mining industry commission is striving after them at the highest ranks. For now, standing in line for the doctor, it is possible to get sick for good...

I left Belchatow with the conviction that despite the numerous difficulties, the builders of the presently largest Polish investment are catching a second breath...

12432
CSO: 2600/1069

ORIGINS OF, REMEDIES FOR ENERGY-INTENSIVENESS IN ECONOMY ANALYZED

Warsaw ZYCIE GOSPODARCZE in Polish Nos 19, 20, 21, 8, 15, 22 May 83

[Articles by Zbigniew Mikolajczyk: "Energy Resources Management"]

[No 19, 8 May 83 pp 12, 13]

> [Text] The excessive energy-intensiveness of the Polish economy is believed to be one of the sources of the present crisis, and perhaps even the main one. If we restrict ourselves to the sphere of real factors in development, then the author of the present work is also inclined to support this latter thesis, and he is attempting to justify it further[1].

Although the phenomenon of excessive energy-intensiveness in the Polish economy has been brought up many times, the idea of the need to make energy resources management more efficient has been manifested rather sporadically at various meetings, in publications, etc. This idea has not played a role in the decisionmaking process, in the scheduling of investments, the selection of technology, the formation of economic mechanisms (prices), etc. Energy resources management has been burdened by the lack of an integrated approach to its problems, and thus one may consider that identification of the causes that have determined the energy-intensive course of the development of our economy is presently just as important a factor in changing the situation as concrete technical or other actions.

The paradox lies in the fact that this lack of an integrated approach has occurred in a sector of the economy that for technical and organizational-economic reasons has been centralized everywhere and is developing into systems of national economic scope, and in the second place, in the fact that this has occurred in an economy that is centrally planned by definition. The toleration of the lack of an integrated approach, and thus of high energy-intensiveness, could only continue until as long as the economy had extensive reserves, including energy ones, and as long as a jolting and cumulative socioeconomic verifications and the present economic crisis did not occur.

As a result of the universal role of energy in all production and consumption processes, and also due to the possibility of reducing various forms of energy to a homogeneous and precisely quantified form, the power industry is forming

an additional system, with the aid of which it is possible to develop an analysis of the economic processes independently of the value aggregates distorted by prices. Energy processes, which are dependent upon economic processes, are for these latter processes a mirror that sheds light on their capability of change, or their effectiveness, broadly understood. Consequently, the formulation of certain conclusions with respect to improving the power industry can thus be essentially reduced to analytical mutual links between all of the determining factors in obtaining and converting energy, and similar determining factors in the economy. We are adopting the assumption that the natural means (the energy sources available) and the technical ones for making the power industry more efficient are always given -- obviously at an increasingly higher (changing) level -- while success in utilizing them depends on economic and sociopolitical factors.

This also determines the nature of the present work. It is intended to be an attempt to conduct an economic analysis of certain structures in energy and in the economy which emerged after the war, particularly in the decade 1971-1980. On the other hand, it is not a work dealing with technical questions regarding the energy budget for the next few years and in the long term, since these questions can only be dealt with properly by a group of specialists. A survey of the structures that changed during the period considered is a necessary condition for determining areas in which energy resources management can be made more efficient and specifying coherent activities in this area.

Results of Neglect

Among the medium to highly developed countries, our country is distinguished by its high energy-intensiveness (Table 1). Since as in the past, this is a lasting phenomenon, the following generalized conclusions are suggested: this is an inherent characteristic of our economy, its fate, or a systematic error committed during the process of development. Such assessments, which have at times been more specific, have been known for a long time, and have not had any effect on reality. This has to be resolved.

Let us assume at the start that the high energy-intensiveness is a consequence of an entire chain of smaller and larger instances of neglect, which have occurred through not taking into account the criteria of energy-intensiveness in the formulation and achievement of management goals, and through the accumulation and national economic situtation. The basic elements of the characteristics of these conditions are contained in Table 2, in which the production of energy raw materials and of electricity per capita is shown, and the relationships between energy raw materials and electricity is given. The data cover 1950 and 1980. Here are some conclusions arising from the data in this table:

1. In 1950, from the standpoint of the indicator of electricity production, Poland was at the bottom of a list of 22 countries. In 1980, Poland's position on this list had not changed, even though the production of electricity per capita had grown nine times during this period. The increase in countries starting at a lower level than Poland was even higher, while in the more developed countries, there was a 4-6-fold increase.

2. The rate of the increase in electricity production in individual countries was covered to differing degrees by their own energy raw materials. In 1950, Poland was surpassed in the production of these raw materials per capita (3221 kg) only by the U.S. (7225 kg) and Great Britain (4366). In 1980, Poland produced 6001 kg of energy raw materials per capita, and was surpassed only by Australia (9376 kg), the Netherlands (7079), Canada (11,019 kg), the USSR (7239 kg), and the U.S. (9695 kg).

3. At the same time, during this period Poland had the lowest indicator among these countries for the conversion to electricity of the energy raw materials obtained (the relationship of raw materials to electricity), which is obviously only one of the elements in supplying the economy with energy, but a prominent one. In 1950 this indicator was 8.48. Countries that mined more hard coal at that time achieved considerably lower indicators. Poland maintained this lead in 1980 with an indicator of 1.75.

4. The amount of indigenous energy-bearing raw materials is essential for every economy from the point of view of its potential or actual energy self-sufficiency. On the other hand, the usefulness of the indicator of the conversion to electricity of energy-bearing raw materials for assessing the situation of a given country varies, since the production of electricity and other forms of converted energy is not only a function of the production of indigenous energy-bearing raw materials, but also of the consumption covered by imports. Consequently, the lower the imports of energy, the more the characteristics contained in the amount of indigenous energy-bearing raw materials and in the extent of their conversion to electricity determines both the situation and the guiding parameter for the development of energy resources management and to a crucial extent, of the entire economy. This applies in the highest degree to Poland.

Influence of Primary Energy Structure

The structure of the primary energy resources obtained also has to be considered. The type of this energy -- solid or liquid fuels, water energy -- technically determines the efficiency of energy conversion to refined forms of energy, and thus also the costs of the final energy consumed by the recipients. In Poland 95 percent of the primary energy obtained consists of solid fuels: hard coal and brown coal.

It is possible to distinguish two types of energy-economic situation as a basis for development. In the first place, all other things being equal, an energy base for production-economic expansion is possessed by those countries which have at their disposal modern technologies and as a result products that can be favorably exchanged for energy sources, and in the second place, by the countries possessing large and naturally more refined energy resources, such as crude oil (and also other important raw materials). Within the limits delineated by these types of situations, it is possible to distinguish many intermediate ones, taking into account the level of technological development, the type of energy-bearing raw materials, and the costs of obtaining them.

The large supplies of solid fuels, the costs of extraction for which are high, however, limit the possibilities for an economic improvement of energy

conversion in Poland, since the latter is a function of foreign trade and thus of the export capacity of the entire economy. With respect to foreign trade in the group of fuels, coal exports and crude oil imports immediately put our economy in an unfavorable situation both in energy and in economic terms. This is governed by the caloric content of these fuels, differences in the efficiency of energy conversion, the values of the nonenergy products of conversion, the prices of these fuels on the world market, and the costs incurred in obtaining them. The situation has been and is being more or less corrected through the terms of trade currently being formulated. As in the past, this does not change the economic essence of these relationships.

Furthermore, coal exports have been strongly competitive with the satisfaction of domestic energy needs. The possibilities for developing profitable nonenergy exports that would partially compensate for expensive domestic energy production have been and are limited. This has been the case because a combination of conditions, for objective and subjective reasons, has recently led to the development of an expensive indigenous energy base, which will be discussed further, and has limited funds for the development of the sector with a higher degree of product processing or refinement.

The first reason for the above-mentioned phenomenon was the coal nature of the indigenous energy base at the beginning of the 30-year period under discussion. This was not a situation affecting only Poland, however; in general, hard coal played a decisive role in the power industry at that time. In 1950, 2329 kg of hard coal were mined per capita, which was 81 percent of the total energy-bearing raw materials. The annual extraction amounted to 111 million tons of coal. In Great Britain, coal extraction per capita reached 4342 kg per capita, and was nearly 100 percent of the energy-bearing raw materials produced, which the total extraction was 220 million tons per year. In that year, while extracting a total of over 74 million tons coal, Poland also met almost all of its needs with the aid of this resource. Further developments occurred differently, however.

In these and other developed coal-producing countries, there was a general decline in the mining of hard coal, after 1960 in West Germany, and throughout the entire three decades in Great Britain. In the U.S., there was a sharp decline in extraction during the years 1950-1960 (by 35 percent per capita). In the succeeding decades, there was an increase, and in 1980 coal extraction approached the level of 1950. This had to do with the exceptionally low costs of coal extraction: about 30 percent of the coal deposits were at a depth of less than 100 meters. In Poland, on the other hand, coal extraction increased from 3142 to 5428 kg per capita between 1950 and 1980.

The essence of the trends described as examples in power industry developments after the war was an improvement in energy conversion by economic means (through foreign trade), and a change in the structure of primary energy consumption in favor of crude oil. In the years from 1950 to 1980, crude oil imports grew 11 times in the U.S. (to 287 million tons), 217 times in Japan (to 217 million tons), 50 times in West Germany (to 100 million tons), 8 times in France (to 113 million tons), and 13 times in Great Britain (until 1973, after which these imports fell as a result of the development of indigenous extraction.) [2]

Poland did not take part in this major substitution during the epoch of cheap crude oil. This was not only a problem of making energy conversion less expensive and securing the energy essential for the economy, but also of developing such sectors as the petrochemical industry and mechanization, for which crude oil and natural gas are the basis. In connection with this, an unusual structure of primary energy consumption was maintained in Poland, with coal fuels having a decisive predominance.

In 1970, according to the GUS [Main Statistical Office], the proportion of coal fuels was 84.2 percent, when it was 31.5 percent on a world scale, 34.4 percent in Europe, 42 percent in the CEMA countries, 25.1 percent in the EEC countries, 30.7 percent in West Germany, 38.8 percent in Great Britain, and 22.2 percent in the U.S. A structure approximating Poland's was observed that year in Czechoslovakia (66.1 percent coal fuels) and East Germany (71.8 percent). It must be added, however, that these countries, with a population about half Poland's secured more crude oil imports (in tons) than Poland.

In the professional literature, the reasons for the present state of energy resources management, the structures, and the energy-intensiveness of production are seen in the structure of the energy resources available; inefficient technologies in industry, the communal economy, transportation, and agriculture; excessive heat losses in buildings; an unfavorable structure in the national final product, characterized by a predominance of raw materials and energy-intensive and materials-intensive products, and a low added value (low degree of processing); and low product durability or poor quality.

These are reasons that have been accurately determined, but they also spontaneously suggest a direct and simultaneous influence on the structure of the primary energy consumed, the structure of the economy (the manufacturing apparatus and production), technological progress, etc. This is a result of the fact that these statements apply to a situation that arose over a long period as a consequence of objective (existing) conditions and economic policy, i.e. investment and technological policy, etc. Only an overall analysis of the factors occurring in this sphere over time can indicate the proper subjects that should be influenced and the goals of the changes.

Consequences of Independence

The problems, causes, and consequences of energy-intensiveness have been revealed gradually in the Polish economy. In policy in this field and in general in economic development processes, there are no prepared patterns of procedure appropriate to each concrete situation, except for a general one, that one should strive to obtain a so-called economic surplus (funds for development). The extent of the possibilities in this field is determined by the level of development and the available production resources, including natural ones, which also applies to primary energy.

At the beginning of its postwar development, Poland, from the point of view of its energy possibilities for economic expansion, was in a situation that gradually turned out to be unfavorable, since it was committed to the development of coal energy. The low index for the conversion to electricity of the

available energy-bearing raw materials (see Table 2) was something more than an invitation to autarchy in this field, as well as others. In the perspective at that time, the current need was to develop an indigenous energy base.

The basis for this was the available indigenous cadre possibilities and technical means, and the motive was the underdevelopment of the domestic power industry and society's general development aspirations. The solution was economically sensible, since it created the prerequisites for an economic expansion that was independent in terms of energy, and also since just by itself it did not determine anything for the future. The dependencies of such a nature increased with time, with a lack of a full economic verification of actions in the field of the production and use of energy, and with the development of the economy's internal connections.

A factor that distorted energy policy from the start and had a strong effect on economic policy as a whole was independence from the situation in the world energy market, and until 1980 the positive balance in foreign trade in fuels and energy. The period of over 30 years was sufficiently long to leave its mark on economic proportions and to consolidate certain structures and methods of resolving problems. This was manifested in a one-sided approach to supplying the economy with energy, in pressure for an increase in the production of energy, and a neglect of activities aimed at conserving it that would have the same value of the energy budget as an increase in production.

The development itself of a power industry based on coal involves large investment, material, and other resources, and affects the structure of production and industry, among other things. This process was accompanied by others: the economic suitability of utilizing important indigenous raw materials, e.g. copper and sulfur, and an increase in the demand of steel, cement, and other so-called heavy products, the manufacture of which led to the development of materials and energy-intensive branches of production. All of this took place under the conditions of forcing a high production growth rate from year to year, dictated by both social needs and the reserves for extensive growth, among other things, large human labor resources.

Nevertheless, the undoubted influence of the structure of industry on energy-intensiveness (which we will document later, using Poland as an example) cannot be considered the only cause. During recent decades, developed countries such as West Germany, Austria, and France, not to mention Japan, showed high growth rates, close to Poland's, for the production (per capita) of the "heavy" products, even with a higher level of production to begin with. The fact that these and other developed countries avoided high energy-intensiveness is associated with its becoming less expensive to obtain energy sources through foreign trade, a decrease in the costs of energy conversion, the utilization of energy-conserving technologies, and the delivery to the world market of proudcts with a high standard of quality and degree of processing.

This shows that the supply of energy to the economy, which is subject to economic transformation, has shifted to nonenergy sectors of the economy, the products of which have provided funds to import refined energy sources instead of

developing a relatively more expensive indigenous energy base, and when there is a lack of such possibilities, funds for a full supply of energy. A characteristic of modern energy policy is its close integration with economic policy as a whole.

The reverse process has been observed in Poland. There has been a rapid development of an indigenous energy base, aided by the links in the following chain: mining -- transportation -- energy conversion plants -- high energy consumption for supplying these and sectors linked to them. The lack of integration between the power industry and the economy, and the treatment of energy deliveries as a dependent variable, are, strictly speaking, the general reason for the high energy-intensiveness of our economy.

Efficiency of Conversion

Overcoming the energy-economic dependencies to which the Polish economy has been and is subject was not and is not possible in the short and medium term. Showing the solutions to which the most developed countries have resorted did not and does not mean that they have always been fully available and capable of being used in our economy. This only serves to indicate that the policy of conserving energy could have been carried out in our country. Acceptance of the thesis that solid fuels will be the basic energy source in our economy until the energy revolution (nuclear energy, possibly economical coal hydrogenation) yields universally accessible results, has not and does not rule out this course and through it, making progress commensurate with the available resources.

The basic elements in the energy budget are evidence of this. In order to illustrate the problem, without entering into detailed calculations (differing numbers are given here), one may assume without much error that in the 1970's, the general efficiency of energy conversions in Poland was about 70 percent. This is the ratio of the energy (measured uniformly, in its final form) received by the consumers in various forms to the total amount of the primary energy consumed. The losses in reaching the final energy include technological conversion losses (in electric power plants, boilers, refineries, coking plants, etc.), and industrial losses. These are losses in phase I which are registered before the meter and storage of the recipient. Further conversions with varying efficiencies take place in the energy receivers of the consumers: in boilers, engines, furnaces, etc., which we call phase II.

Prof Czeslaw Mejro estimates that the overall efficiency of all of the energy conversions in Poland is 25-30 percent[3]. This means that the total losses from conversions amount to 70-75 percent, most of which comes from the second phase and occurs in the receivers of the consumers. In other words, each unit of energy used recently (as the output) corresponds to 3-4 units of primary energy (as the input), i.e. the effective use of a unit of energy is accompanied by the loss of 2-3 units of energy. The distribution of the losses on each occasion indicates the extent of the conservation of energy, and makes it imperative that at least equal attention (efforts and funds) be devoted to the efficiency of energy conversions in phase II. This is not only of significance for energy. We will return to this matter again.

The direction that emerged within Poland's postwar energy and economic policy was expressed primarily in the development of phase I: obtaining primary energy sources and converting them into usable forms. It is not possible to speak of priorities here, although the one-sideness of the outcome of this process is obvious, since it was not guided by a single long-term concept. The present situation arose gradually and spontaneously within the framework of objective conditions and current pressing budgetary and social needs, which a turn gave rise to secondary governing conditions.

Another consequence of the above is the fact that full, generally acceptable documentation providing a picture of the efficiency of energy conversions by the recipients does not exist. According to Czeslaw Mejro, we generally have precise data on the amount of electricity consumed by the recipients. On the other hand, there is a lack of precise information on how we utilize this energy. The lack of interest in this is symptomatic. For this reason, even an articulation of the concepts and solutions aimed at resolving energy problems runs into difficulties. These difficulties are even greater as it becomes less possible to judge or verify these solutions throughout the entire chain of technical-energy and economic dependencies.

An increase in the energy efficiency of a single element does not have sufficient strength for a breakthrough, since by itself it has quantitatively small effects, which do not appear to be worth the trouble. They are manifested only in an extended energy account. When there are no data for such an account, then the thesis put forward in professional publications, that investing or making other outlays to conserve energy will pay for itself, is suspended in a vacuum. The construction of a boiler or an electric power station has not been threatened by this.

The solutions under discussion must therefore be considered adequately, and even with a certain overemphasis, since: 1) they are marked by a greater degree of complication, and 2) they have to surmount the existing structures and dislodge the established methods of approaching this. The latter arose in an epoch of considerable extensive (and energy) reserves, and strong aspirations for achieving a high growth rate. In their time and scope, utilization of these factors and circumstances made economic sense. From the standpoint of energy, this was expressed in maximizing the production of energy while at the same time restricting solutions aimed at conserving it.

Production and Conservation

This approach was both simple, and for some time not without value. It led, generally speaking, to productive use of the existing production resources. In the area of the power industry, the mining of its raw materials and their conversion had a tradition, and its further development (as well as that of the other "heavy" sectors) was relatively rapidly mastered from the technical and organizational standpoint. The solution of energy problems was concentrated in large economic units, grouped into a few sectors that were easily managed from a single central point.

This undoubtedly made things easier when it came to balancing the energy budget: a few specialized energy producers were ordered to satisfy the needs. In

balancing the budget while conserving energy, the list of partners-executors is expanded tremendously, while use of this method requires resolving investment and technological issues, etc., in contact with virtually all elements of the economy. The fact that in doing so numerous connections would be formed and the entire economy would be profoundly rationalized was not as obvious at the beginnings of the process as it is today, and on each occasion it was not obvious enough to outweigh the simplicity and advantages of the first variant.

This was especially true since solutions of the first type (the production of energy and also the development of sectors closely related to it), though the allocation of resources, broadly understood, attracted and gathered personnel and material-technical potential. In this manner, strong social-professional groups were formed which became spokesmen for maintaining the existing structures, since having large funds at their disposal boosted their position and prestige. One should not be misled here by the miners' opposition (in 1980) to an extensive energy policy and the extension of working hours, since this protest was not caused by the concept of giving priority to the power industry, broadly understood, or the high position of this field, but rather by the consequences of the unrestrained pushing of this concept.

It was a sort of reflection of the recent period, which had the significance and energy of thunder for the economy, i.e. it occurred with a force and destruction equal to that of thunder, since this is how one may define the result of the decrease in coal mining by 18 percent in the course of a single year (1981). It happened to be the case that the miners put forward slogans and developed arguments in favor of conserving energy. This was an unusual and on the whole constructive impulse. One may add that it was a definitive one, and be surprised at how lasting it was, since in order to obtain the necessary increase in coal extraction it was necessary to resort to extraordinary economic and noneconomic resources. There should be no doubt that the appearance of miner opposition should be shifted to the principle of continuing conservation, since after all the energy of thunder cannot be utilized.

The paths for arriving at a full understanding of the necessity of energy conservation, and willingness to make appropriate preparations in this field, were, as one can see, complex. This is associated with the circumstances discussed above and with the nature of the problem. The close link between energy use and technology did not permit the formulation of general guidelines for energy resources management in industry, according to Czeslaw Mejro, since in many cases it has to be subordinated to technological concerns. The share of the costs in the total production costs (direct energy-intensiveness) is sometimes very small. As a result, more than once the production engineers managing production or projecting the acquisition of technology have ignored energy problems.

This created one of the sources of disintegration on the energy-economy axis, which I mentioned above, and which will be discussed again. The coincidence or disparity of the interests of energy, on one hand, and of technology and production of the other, is an issue of economic and energy accounting. Extended energy accounting, i.e. developed throughout all interrelated phases,

is, as I have tried to show, an additional and independent support for economic accounting. The former has the benefit of being free from the price distortions that occur in economic accounting. Due to this, energy accounting in Poland is becoming a sort of morphology of an economy that is excessively wasteful of production resources.

On the basis of the survey that we have conducted of energy resources management in Poland, and also on the basis of what we intended to develop further, we can formulate the conclusion that energy conservation in the economy and production exhausts the problem, since it is an essential part of what we term modernity, high quality, and efficiency.

In other words, energy conservation is an important factor for progress in the economy.

Table 1

Consumption of Primary Energy and the Energy-Intensiveness of the National Income

	Poland	Hungary	Austria	France	FRG
Consumption of energy in standard fuel tons per capita per annum	4.7	4.0	4.9	5.1	6.4
Energy-intensiveness of the national income in standard fuel kilograms per $U.S. 1,000	1290	1086	634	576	616
in percent	100	84.9	49.1	44.7	47.8

Source: "Energy Predictions for Poland Until 2020" [Prognoza energetyczna Polska 2020], the Chief Inspectorate for Energy Resources Management, Research and Development Center, Katowice, 1982.

Table 2

Energy Production Per Capita

Producing country	Energy Raw Materials in kg *		Electricity in kWh		Ratio 1:2	
	1950	1980	1950	1980	1950	1980
Poland	3221	6001	380	3426	8.48	1.75
Australia	2351	9376	1163	6685	2.02	1.40
Austria	836	1264	916	5659	0.91	0.22
Belgium	3163	835	982	5375	3.22	0.15
Bulgaria	424	2118	110	3931	3.85	0.53
Czechoslov.	2760	4380	749	4747	3.68	0.92
Denmark	--	123	515	4786	--	0.03
France	1303	863	791	4500	1.64	0.19

Spain	443	787	248	2939	1.78	0.26
Netherlands	--	7079	733	4494	--	1.57
Japan	532	334	541	5044	0.98	0.06
Yugoslavia	446	1402	147	2655	3.03	0.12
Canada	2146	11,019	4006	15,372	0.53	0.71
E. Germany	2391	5009	1059	5904	2.25	0.84
FRG	2863	2739	929	6034	3.08	0.45
Romania	819	3989	130	3038	6.30	1.31
U.S.	7225	9695	2553	11,626	2.85	0.86
Sweden	393	1202	2592	11,538	0.14	0.10
Hungary	911	2110	321	2229	2.83	0.94
UK	4366	5124	1251	5100	3.49	1.00
Italy	98	436	528	3237	0.18	0.13
USSR	1541	7239	507	4877	3.03	1.48

*) Calculated in terms of hard coal.

Source: RS 1971, p 635; RS 1981 p 674

Table 5

Tabela 8

Struktura zużycia energii finalnej w proc. 1)

Wyszczególnienie 2)		Ogółem 3)	Przemysł 4)	Budownictwo 5)	Rolnictwo 6)	Transport 7)	Sektor komunalno-bytowy 8)
Ogółem 3)	a	100	52,8	2,0	2,4	8,0	34,8
	b	100	51,4	2,1	2,8	7,1	36,4
Energia pierwotna 9)	a	35,2	10,4	0,2	0,5	3,8	20,3
	b	35,8	10,9	0,2	0,6	2,3	21,3
w tym: 10)							
węgiel kamienny 11)	a	27,8	5,1	0,2	0,5	2,5	18,3
	b	27,3	5,2	0,2	0,5	2,3	18,7
Energia pochodna 12)	a	64,8	42,1	1,8	1,9	5,1	13,9
	b	64,5	40,3	1,9	2,1	4,9	15,1
Paliwa ciekłe 13)	a	11,1	3,2	0,9	1,3	3,9	1,8
z ropy naftowej 14)	b	13,2	4,4	1,1	1,4	4,1	2,2
Energia cieplna 15)	a	23,9	16,1	0,6	—	—	7,2
	b	24,0	16,2	0,5	—	—	7,3
Energia elektryczna 16)	a	9,8	7,0	0,3	0,3	0,4	1,9
	b	10,1	6,8	0,3	0,5	0,5	2,1

Dane GUS: a — 1975 r.; b — 1980 r.

Key

(1) Structure of the consumption of final energy in percent
(2) Specification
(3) Total
(4) Industry
(5) Construction

(6) Agriclture
(7) Transportation
(8) Communal-daily sector
(9) Primary energy
(10) including
(11) Hard coal
(12) Derivative energy
(13) Liquid fuels
(14) from crude oil
(15) Heating energy
(16) Electricity
(17) GUS data; a -- 1975; b -- 1980

Table 6

Tabela 6

Gałęziowa struktura zużycia energii finalnej w przemyśle w proc., ceny 1977 r., cały przemysł uspołeczniony = 100 1)

Wyszczególnienie 2)		3) Zużycie energii: 4) ogółem	3) Zużycie energii: 5) w tym: elektr.	6) Prod. mająt. trwały	7) Prod. czysta
1. Hutnictwo żelaza 8)	a	25,9	11,0	7,6	9,3
	b	27,6	12,3	8,9	9,6
2. Przemysł chemiczny 9)	a	18,4	20,0	11,2	16,3
	b	17,7	17,5	10,4	10,6
3. Przemysł paliwowo-energetyczny 10)	a	14,8	25,9	26,7	15,6
	b	12,4	26,9	25,8	12,6
4. Przemysł materiałów budowlanych 11)	a	12,3	5,6	5,6	2,3
	b	10,6	5,4	5,0	1,7
Razem 1—4 12)	a	71,0	62,5	51,1	31,5
	b	67,7	64,1	50,1	27,9
Pozostały przemysł 13)	a	29,0	37,7	48,9	68,5
	b	32,3	35,9	49,9	72,1
Przemysł elektromaszynowy 14)	a	.	11,9	17,3	22,6
	b	.	13,0	22,8	34,5

a — 1975 r., b — 1980 r. 15)

Key

(1) Structure by branches of the consumption of final energy in industry in percent, 1977 prices, with the entire socialized industry = 100
(2) Specification
(3) Consumption of energy
(4) Total
(5) including electricity
(6) Production fixed capital
(7) Final production
(8) Iron-smelting
(9) Chemical industry

(10) Fuel and energy industry
(11) Construction materials industry
(12) Total 1-4
(13) The remaining industries
(14) Electrical machinery industry
(15) a -- 1975; b -- 1980

FOOTNOTES

1. Based on material prepared for the Economic Consultative Council.

2. "The influence of Changes in World Fuel Markets on the Economic Development of Poland Until 2000" [Wplyw zmian na swiatowych rynkach paliwowych na rozwoj gospodarczy Polski do 2000], collective work of the Institute for Economic Development of the Main School for Planning and Statistics [SGPiS], Warsaw, 1982.

3. "The Basis of Energy Resources Management" [Podstawy gospodarki energetycznej], Warsaw, 1974, p 56.

[No 20, 15 May 83 pp 12, 13]

[Text] Overcoming the dependence in which the Polish power industry developed during the postwar period (as I described it in the preceding article in ZYCIE GOSPODARCZE no. 19) could not be either a brief or a one-time process. Nevertheless, there were conditions for changing the existing dependences. They were created by every multiyear plan, particularly combined with larger investments, the introduction of new technologies, etc., such as the 1971-1975 5-year plan. An analysis of the experiences acquired should also yield results as the years go by. Meanwhile, in the years 1971-1980, the noose of energy limitations has recently tightened in the Polish economy: the expansion of investments, production, and imports has proceeded in conjunction with a continuation of high energy-intensiveness.

The general principles or models for making energy resources management more efficient are categories that are almost universally familiar, at least among those involved in this. If little has resulted from this for economic practice, that is a consequence of many causes, the first of which remains the lack of a proper exemplification of the energy conservation tasks in a manner suitable for the actual economic structures, for their complete comprehension, and what is most important, for change.

In connection with this, the quantitative and complete documentation of energy problems gains in significance. Nevertheless, the informational base available to an economist does not seem to be the best. The universally available data (from the GUS) allow only general characterizations; more specialized information covers the years 1971-1980, and most often the years 1976-1980. There are also specialized sources, research institutions, and GIGE [Chief

Inspectorate for Energy Resources Management]. In this background, one should note differences with respect to the calculation methods, the measures used, and consumed that occur in various works. Among other things, this is associated with taking into account such fuels as wood and peat, and with different estimates of the losses between the extraction and consumption of the primary energy, etc.

GUS has a higher estimate of the general extent of the primary energy obtained than GIGE does. In 1970, according to GUS, the primary energy obtained amounted to 136.5 million tpu, while according to GIGE, it was 127.2 million tpu. In 1981, it was 148.4 and 145.8 million tpu, respectively, i.e. with the passage of time the differences are reduced from 7 to 2 percent. Table 1 presents the balance from the GIGE work, since it provides a characterization of the energy sources by type.

Balance of Primary Energy Consumed and Obtained

Table I

		1970	1975	1980	1981
Primary energy,	c	111.1	139.5	173.7	159.5
million tpu	p	127.2	155.0	170.8	145.3
Crude oil,	c	11.3	19.7	25.4	22.3
million tpu	p	0.6	0.8	0.5	0.4
Natural gas,	c	6.5	8.8	11.8	11.2
million tpu	p	5.5	5.9	5.6	5.1
Hard coal,	c	85.2	101.0	120.6	116.4
million tpu	p	111.9	137.3	154.4	130.3
Brown coal,	c	7.8	9.6	9.6	9.2
million tpu	p	8.9	10.7	9.9	9.6
Solid fuels	c	93.0	110.8	136.2	125.6
	p	120.8	148.0	164.3	139.9
million tpu	c	83.7	79.4	78.4	78.8
in percent	p	95.0	95.5	96.2	96.0

c -- energy consumed; p -- energy produced

Electrical energy, which is about 0.2 percent of the primary energy, is not listed separately.

Source: A. Szpilewicz, "Gospodarka paliwami i energia 1981" (Fuels and Energy Management in 1981), GIGE, 1982.

Economic Results of Neglect

In the years 1971-1975 and 1976-1980, the consumption of primary energy, in terms of conventional fuel [cf] (1 kg cf = 7000 kcal) grew at approximately the same rate. The growth rate of primary energy production was lower than this and declining. The general balance of the energy produced and consumed also changed, along with the structure of the types of energy. In 1980, the previously occurring export surplus of energy essentially changed into a permanent deficit.

Balance of Primary Energy Produced and Consumed, in Millions of Tons

Table 2

Type	1970	1975	1980	1981
Total	16.1	15.5	-2.9	-13.6
Crude oil	-10.7	-18.9	-24.9	-21.9
Natural gas	-1.0	-2.9	-6.2	-6.1
Hard coal	26.7	36.3	27.7	13.8
Brown coal	1.1	1.1	0.3	0.4

Source: as in Table 1

The general balance is a balance for exports and imports together, in which the only positive balance is formed by coal. During the transition from the 1970's to the 1980's, Poland became a net importer of primary energy. In 1980, the negative balance in the energy aggregate was still small: in 1981 it gres sharply as a result of the drop in the mining and exporting of coal. In 1982 and in the future, with a stabilization of moderated growth in imports of crude oil and derivatives and natural gas, and an increase in coal exports, the negative balance will be reduced, but it will remain a permanent phenomenon in our economy.

The real problem however, is not the energy balance (in conventional fuel units), but rather the balance in economic terms, i.e. the actual burden on the economy in energy imports, and also, developing the problems further, the production of indigenous energy. A complete calculation, taking into account the prices, cost, and productivity of energy, requires a separate work.

An interesting attempt at such a calculation is conducted by A. Szpilewicz in the GIGE work cited above. He proceeds on the basis of such characteristics of energy as its cost and productivity, and estimates the transactional value of individual energy sources in 1981 U.S. dollars. Next he takes the value of one ton of hard coal (converted to conventional fuel) as having a value of 1 and relates it to the value of other sources (also converted to conventional fuel). On this basis, he establishes value indices. It turns out from these conversions that the value index of the primary energy produced in Poland in the years 1971-1980 is slightly over 1, while it is 1.2-1.3 for the primary energy consumed, and 2.4 for imported energy, since we import more refined and more expensive fuels.

This calculation approaches the economic essence of the matter, i.e. the actual burden on the economy; it demonstrates that the import and export balance thus calculated was in principle negative as early as 1970, but it makes the error of transferring the 1981 conditions to the entire period, without taking into account the current terms of trade. The actual course of the phenomena over time was different, among other things, for the reasons discussed below.

It turns out from the foreign turnover balance for fuels and energy that in 1970 the positive balance in fuel and energy turnover was 811.6 million foreign exchange zlotys; in 1975, 2928 million foreign exchange zlotys; in 1980, -3229 million foreign exchange zlotys; and in 1981 -6101 million foreign exchange zlotys. In 1982, the negative balance was cut almost in half as a result of the doubling of coal exports (in comparison with 1981).

Prior to 1975, the sharp increase in crude oil and gas prices on world markets in 1973 was not markedly reflected in the foreign turnover balance for this group of products; the increase in coal prices in exports to [payments] area II had a positive effect, while the increase in crude oil and gas prices still did not have a strong negative influence on the balance, since most of our imports came from the USSR. After 1975, coal prices stabilized, and the increase in the prices of hydrocarbon fuels from area II and the USSR began to take effect on the basis of the principle of progressive prices.

As a result of this, the previously positive balance dwindled away and was converted into a high negative balance, which in 1980 was 50.5 percent, and in 1981 81.5 percent of the overall negative balance in our trade turnover. This illustrates, admittedly in a manner made somewhat more vivid by the crisis, our economy's capacity to resolve energy problems by means of foreign trade.

The worldwide wave of a sharp increase in the prices of hydrocarbon fuels struck our economy late, and at a time that was exceptionally difficult for it. Presently -- this can be stated now with complete certainty -- one may conclude that in spite of everything, our receiving this blow at the time of its appearance (1973-1975) would have been more favorable. The economy was nevertheless stronger and equipped with more resources, but it was also intoxicated by superficially understood successes, and for a long time prior to this it had been accustomed to easily available and apparently cheap energy. A shift begun 5-8 years earlier would have had greater chances, and would be providing certain benefits at present.

Let us go on to the internal problems of energy resources management in that period and the efficiency of energy conversions, which are illustrated in Table 3, and to their economic aspects.

Primary Energy Consumed and Final Energy

Table 3

Category	1970	1975	1980	1981
Primary energy consumed, million tpu	111.1	139.5	173.5	159.5
Final energy, million tpu	90.6	107.8	127.8	111.6
Conversion losses, million tpu	20.5	31.7	45.9	42.9
Conversion efficiency (%)	81.3	77.3	73.6	73.1

Source: as in Table 1

The overall conversion efficiency shown is a consequence of structural changes in the consumption of primary energy and the technological efficiencies of the principal energy conversions, i.e. electrical, coke and gas, and refinery conversions. These changes are technically determined and separately (except in recent years) they have shown increasing efficiency. The overall decline in conversion efficiency was mainly the result of the decrease in the direct consumption of primary energy by the consumers, and its conversion to more refined energy sources, burdened with the technical conversion losses registered in this balance. Thus, the share of solid fuels converted to heat and electricity grew from 47 percent in 1970 to 55.8 percent in 1981, including an increase in conversion to electricity from 24.8 to 32.6 percent. Nevertheless, primary energy transmitted directly to the consumers only theoretically improves overall conversion efficiency, since as a rule most of it is consumed in low-efficiency receivers.

It turns out from the data in Table 3 that the consumption of primary energy in the years 1971-1980 increased at an annual average of 4.6 percent, and the consumption of final energy at an annual average of 3.5 percent. In reality, the economic burden resulting from this was greater, which can be established (although not fully estimated) through the transactional value from the nergy used, as discussed above. Without documenting this more fully, we will state that the rate of the growth in the transactional value was higher in the years 1971-1980 than the consumption of energy in natura, and during this period amounted to an annual average of 5.3 percent for primary energy. This was a rate that exceeded the growth in the national income at that time.

In the years 1971-1980, in spite of a large investment and technological input (licenses), the repertory of resources in the struggle for reducing energy-intensiveness was not only not expanded, but even reduced. The basic tasks in this area thus still remain to be resolved.

Areas for Increasing Efficiency

The main areas for increasing the efficiency of energy resources management lie in the sphere of the production of primary energy and its conversion into more

refined forms, the transportation (transmission) of energy, the efficienct of the conversion of various forms of energy by its final users, and the associated problem of the efficiency of the receivers of the energy that is delivered to them.

Let us consider these issues in turn.

Energy resources management based on indigenous solid fuels has one positive characteristic for us -- reliable access to the energy sources. It is decidedly unfavorable, however, in view of the capital - and energy-intensiveness of primary energy production, the conversion costs, etc. The outlays for the production of solid fuels with a constant or increasing energy-intensiveness are a function of the demand for energy, since other outlays -- under the given geological conditions -- are virtually independent and are unavoidably increasing.

The capital-intensiveness of the extraction of hard coal and brown coal (the value of durable property in 1977 prices per ton of conventional fuel), according to GUS data, amounted to 1236 zlotys in 1975, 1481 zlotys in 1978, 1715 zlotys in 1980, and 2092 zlotys in 1981; the sharp increase in 1981 was in addition a result of the large decrease in extraction. We should add that in 191 the fuel and energy industry accumulated 26.4 percent of the durable property of the industry. Furthermore, in the years 1971-1980, the characteristic changes in the investment structure of the fuel and energy industry increased: in 1970 the coal industry absorbed 35.2 percent; this share gradually increased to 55.2 percent in 1981. This shows the tension that arose in the "output" of the fuel and energy industry, since the share of investment outlays in the fuel and energy industry declined.

With the increase in outlays for the production of solid fuels, the efficiency of the conversion of this energy in energy boilers has had and does have enormous significance. About 68 million tons of conventional fuel is converted in them, which is about 47 percent of the national primary energy consumption. Through an increase of 1 percent in the efficiency of the boilers -- which is possible without investment outlays, but only by adhering to energy and operating norms -- it is possible to conserve over 1 million tons of conventional fuel each year.

The situation and the reserves in this field are shown by the age of the boilers, which determines their technical parameters and the degree of exploitation. According to the GUS data, the structure of the age of energy boilers was as shown in Table 4.

Age Structure of Energy Boilers in 1978, in Percent

Table 4

Category	under 20 yrs.	20-40 yrs.	40 or more
Total	79.3	16.9	4.7
steam	70.9	10.9	10.3
water	83.3	14.7	2.0

Large boilers	62.3	22.7	15.0
steam	42.3	27.4	24.3
water	82.0	16.1	1.9

The greatest role is played by large steam boilers, which convert 81.4 percent of the primary energy into heat, and 100 percent of this converted energy into electricity. In this group, over 50 percent of the boilers have been operated for 20 years or more, and 24.3 percent for more than 40 years.

In this sphere (the production of heat and electricity). under the given structure of the fuels and the standard of conversion equipment, about two thirds of the losses occur in the conversion from primary energy to refined energy sources.

The modernization of energy boilers, as is evident from the above data, is one of the main factors in improving the energy situation. Developing this course of conserving energy will overcome the one-sidedness that has afflicted energy resources management thus far and involve other fields of industry in this action -- the manufacture of more efficient energy installations, etc., that, one might say, would naturally modernize the branches of industry that are associated with energy.

The possibilities for action are varied. They are fairly good with respect to large installations. For example, this particularly applies to energy boilers, the design and manufacturing methods for which are characterized by a high technical level, while at the same time the production capacity of industry currently exceeds the country's needs. On the other hand, the production of auxiliary equipment, such as pumps and stirring and dispersing stations, has not been instituted in Poland.

On the other hand, in regard to industrial and communal boilers, the deficit in their production is about 35 percent, while about 5,000 of these boilers, operating with an efficiency of less than 60 percent, are qualified for replacement. In connection with this, orders are being issued for initiating the production of boilers with overlay hearths, for poorer grades of coal, and for developing the production of E[and KR boilers, replacing the obsolete WCI and PCO boilers. On the whole, this demonstrates little interest in this area of making energy resources management more efficient.

The next areas and reserves for reducing energy consumption are based on the category and activity structures of final energy consumption. Let us consider certain problems suggested by the data in Table 5, although it is possible to develop a fully detailed list of tasks with varying degrees of realism with respect to technological preparation, time, resources, etc.

Our attention is attracted by the high and not declining share of primary energy sources in the consumption of final energy, which increased in 1981 in connection with the improved supply of coal to the villages. From this form of energy, socialized industry consumed about 30 percent, while the communal-daily sector consumed about 60 percent. The essential thing is the efficiency of the conversion of this energy by the recipients. Boiler and electrical plants

sometimes achieve higher efficiency, due among other things to the so-called combined economy and to the utilization of byproduct heat.

A particular problem is the consumption of primary fuels in the communal-daily sector, mainly in households in the city and in the village, where this fuel is consumed in low-efficiency equipment. The determining factors thus resulting cannot be overcome within the framework of the construction of large heating and energy systems. They can and must be resolved through the design and manufacture of energy-conserving equipment for this type of consumers. This is especially important because it does not require capital-intensive or state-of-the-art techniques, and can be accomplished relatively rapidly. The programs currently being developed provide for this.

Heating plant policy and the heating of buildings are associated with the question raised above; 23 percent of the country's requirement for primary fuels is being allocated for this purpose. The level of the heating of homes in large urban areas using centralized heating is insufficient. The use in construction of multilayer materials with unsuitable thermal insulation properties (or deviation from technological norms) has caused large heat losses. This, together with the unsatisfactory efficiency of centralized heating, the transmission network, etc., has recently been reflected in the idea of limiting centralized heating. This view has been opposed by the Main Inspectorate for Energy Resources Management, which argued that limiting this type of heating would cause an increase in coal consumption in local boilers, including the coarser and medium grades of [coal] in short supply, which have low efficiency; that it would make it more difficult to resolve environmental protection problems; and that it would bring about a freezing of part of the outlays incurred thus far for the heating networks constructed with reserve capacity.

Resolution of the problems of energy equipment for individual consumers or for heating cannot be subject to changes in the courses of activity motivated by circumstances. It is a matter of the production of materials and equipment for the power industry and for the users of energy (for example, thermal insulation materials). These are already tasks virtually dependent upon all of industry, like others to which we will call attention further on.

It is in similar categories that one should examine the majority of the issues associated with making manufacture more efficient, transmission losses, and the consumption of electricity, which fully require that they be dealt with by specialists. I will call attention directly and indirectly only to certain problems.

The replacement of hydrocarbons by electricity is relevant today and will be for practically the next few decades. The scale of this substition cannot be large in Poland (this is not a question of resubstitution; Poland is in the lead with respect to a low share of hydrocarbon fuels in overall consumption); however, this possibility nevertheless exists. This phenomenon is occurring in transportation, among other things. In the 1970's, we observed a stabilization of the consumption of electricity in PKP [Polish State Railroads] traction, and a drop in municipal traction. The energy efficiency of steam traction is 6 percent, and the efficiency of electrical traction is about 25

percent. The efficiency of combustion traction is even higher, but is associated with higher costs. If the relative cost of transportation by steam traction is taken as 100 percent, and the cost of electrical traction 28-30 percent. [1]

Nevertheless, the pace of railroad electrification has fallen the 200 km per year year at present, while it was about 400 km per year at the beginning of the 1970's. Increasing the pace of railroad electrification does not require an increase in foreign purchases and licenses, but only more efficient organization and an expansion of the production of rolling stock and electrical traction equipment. Electrification of the railroads at the pace of 500 km per year also means conserving about 60,000 tons of motor oil and considerable amounts of coarse, high-caloric coal.

Similar problems can be observed in urban transportation, in which electrical traction was dislodged in the 1970's by the bus, a means of transportation with less transport capacity that required importing 30 tons of crude oil per bus each year.

Specialists formulate the thesis that the development of collective transportation in urban areas and in large cities is a necessity resulting from city planning, social, energy, and ecological assumptions. Public transportation in Poland should be made as independent as possible from imported liquid fuels. The basic means leading to this goal is a broadly conceived electrification of public transportation.[2]

Unfortunately, this conclusion comes into conflict with extremely unfavorable conditions: neglect in the production of electrical traction rolling stock and spare parts, and the liquidation of many electrical traction lines -- in short, the consequences of the greatly delayed echo in Poland of a fascination with any combustion traction.

Structure of Consumption in Industry

Industry consumes over 50 percent of the final energy, and as both a producer and a consumer of energy, it has a decisive influence on the energy-intensiveness of the economy: through the structure of its production and the structure of the energy sources consumed, the technologies utilized, etc. The GUS data in Table 6 are a general introduction to these problems. The table actually covers the years 1975-1980, but the trends observed there are true of the earlier period.

It turns out from the data in Table 6 that the four most energy-intensive branches consume over two thirds of the total energy and somewhat less electricity, and in doing so accumulate over 50 percent of the production durable property while supplying less than one third of final production. This illustrates the structural source of the economy's energy-intensiveness, although the numbers describe only direct energy-intensiveness. Comparing the indices of the share in energy consumption to the share in production property allows us to conclude that overall energy-intensiveness (the so-

called extended energy-intensiveness) is already high within these branches and is higher than given.

The high share in the value of production capital means, among other things, high steel-intensiveness, while iron-smelting occupies first place in the consumption of energy. In the 1970's, progress in energy conservation in this branch was only observed in blast furnace processes (pig-iron). There was an increase in the consumption of energy for the production of a unit of martenite steel, electric steel, and rolled products. The assessment would be even less favorable if we compared the quality standards of the final metallurgical products, which is reflected in the relations of the prices received in exports and the prices paid in imports for a unit of metallurgical products.

The technological dependences among these four branches (energy, production capital) result in their tying up among them a considerable portion of the manufactured goods. This creates a phenomenon of self-supply on a broad scale, and a mechanism for the self-perpetuation of the structural energy-intensiveness of industry, which constitutes a burden for the entire economy, since these branches have competed strongly and effectively for resources for development, especially where this has occurred in a short period.

Current short-term decisions in this area create situations difficult to recover from in the structure of the manufacturing apparatus, and reduce the chances for changing these structures, since the consequences of such a policy increase gradually and make themselves known subsequently with great force.

This generally explains the fact of the emergence of economically incorrect structures in the economy, which, although they have been recognized and criticized for a long time, did not change even when energy shortages were already making their presence strongly felt, as in the 1970's. Allocation or technological solutions expressing the necessity of dealing with energy-intensiveness were rejected on the grounds that they required large investment outlays.[3] The fact that such decisions result later in a greater need for investments and energy escaped everyone's attention.

Improving structures in the economy, especially from the point of view of energy-intensiveness, cannot be resolved in the categories of quantitative allocation, since unchanging joint technical factors (the consumption of given means of production) will in practice restore the status quo ante, even if the resources for the "heavy" branches are limited in advance. The correct solution is a qualitative allocation: the selection of suitable technologies and their being examined over entire technological-production periods.

"Chief Power Engineer"

It is on this basis that one should examine and define the role of the electrical machinery industry, which has to perform the function of the chief mechanic in the economy and thus also the function of chief power engineer, in view of the fact that it produces the equipment that converts primary energy and the

equipment utilizing the final energy. The thesis that energy conservation is still one of the factors in resolving our energy problems is currently being strongly emphasized by specialists.

At the same time, it is being noted that industry is not prepared for the manufacture of energy-conserving receivers and has not had sufficient investments. Actually, the view concerning underinvestment can be formulated in any situation, with varying degrees of economic satisfaction or difficulty for that reason, since this assessment is relative in nature. It should be noted, however, that in the 1970's investments and production capital in the electrical machinery industry grew more rapidly than in industry as a whole. This industry's share in the purchase of licenses was not small, either. The thesis about the lack of preparation and underinvestment simply means that the increased funds for development -- as in the entire economy -- were not utilized from the standpoint of conserving energy (as well as others).

I illustrated this earlier by using the example of energy boilers. There are also other possibilities -- considered in the plans for the periods until 1985 and 1990 -- such as the electronification of energy equipment.

It is felt that the introduction of electronic regulation systems for electric motors will in effect yield a 10-15 percent conservation of electricity. On the national scale, this corresponds to saving 800 MW of power. Side by side with this, the problem of increasing the efficiency of driven systems has to be resolved effectively in the production of machinery. For example, about 50 percent of the power of a motor is used for the edge of the cutting blade of a lathe, and the rest is "lost" in the gears. In an analogous manner, the elimination of electron tubes (except for the picture tube) in televisions can yield a conservation of about 300 MW of power. The introduction of electronic regulation systems for the ignition and feeding of fuel in the production of automobiles would allow saving about 350,000 tons of fuel per year, it is estimated.[4]

The electrical machinery industry (and certain other branches), as it appears from the last considerations, has had and still does have a decisive role to play in the area of reducing energy-intensiveness. These are tasks on both a basic (the most realistic) and advanced level. Their completion depends on this industry's becoming more active in design and production, with this activity aimed decisively and in a comprehensive manner toward reducing the energy-intensiveness of the economy. Without such an effort, the resolution of energy problems will still return to its old course, and find an outlet primarily in increased energy production and an associated increase in outlays, and it will lead to extensive structural consequences in the economy. This task is obviously not incumbent on the electrical machinery industry alone, although it plays the chief role as the producer. The initiation of concentrated and lasting pressure for energy conservation is a more widespread task in our situation. This will be discussed in the following article.

FOOTNOTES

1-4. "Raport o stanie elektriki polskiej" [Report on the State of the Polish Electrical Industry], Association of Polish Electrical Engineers, Warsaw, September 1982.

[No 21, 22 May 83 p 11]

[Text] The basic thesis resulting from the considerations thus far is as follows: as development proceeds, reducing the energy-intensiveness of production is becoming a function of the entire economy, a task that is incumbent not only on the producers of energy, but to an equal extent -- as a rule -- on the rest of the elements in the economy, although the quantitative determinants of this obligation will differ and vary. These tasks should be carried out with the aid of technical, organizational, and economic methods, or in other words, with the aid of both direct (resource allocation) and indirect methods (prices or other economic instruments).

Important conclusions can be derived from this for the tasks awaiting the economy. They would be simple and beyond discussion if not for the experiences and the conditions under which they have to be formulated and resolved. Here are certain elements defining the principles for these instruments.

The preparation of a central program for making energy resources management more efficient is indicated. This suits the needs and the nature of the problem, since the power industry performs an infrastructural function in the economy, and is subject to economically justified centralization. The consequences resulting from adoption of this thesis were not questioned during the discussions of our reform, even in the concepts going furthest in the direction of making enterprises autonomous. In the second place, a new situation is being created, although with difficulty, by the autonomy achieved by enterprises. Finally, in the third place, the state of economic imbalance has a very strong influence on the concepts of actions with respect to conserving energy.

In connection with this, we must first of all consider what we have called the principles for instruments for conserving energy. It is easy to see that in this precisely depicted situation, a special form is assumed by activities (and their relationships to each other) of the direct type (resource allocation, orders) and of the indirect type, i.e. eliciting energy conservation by economic means in economic units. On this basis (as well as others) the problem of guarantees has arisen in Poland. In very general terms, guarantees have the characteristic of lulling people. In energy, just as in several other fields, a need has appeared for economic guarantees, funds for development together with irrefutable economic and social arguments. But together with this, a new basis has spontaneously appeared for one-sidedness in resolving the tasks of supplying energy.

Scope of Energy Resources Management

The solutions being prepared appear to indicate that the view on the need for integral treatment of energy problems in the economy, which after all has been strongly emphasized more than once, is not adequately justified and understood, at least in such a manner as to constitute a counterweight for the division by branches, which has been established for decades, of energy

problems, the emergence of which I have attempted to document in these discussions to the best of my ability.

We do not think that the concept and scope of fuel and energy complex (or industry) have been properly formulated. As one may infer from officially expressed opinions, this complex includes the entirety of the production of all fuels, their conversion into electricity, heat, coal gas, and coke, and also the infrastructure for the transport of primary and converted energy. (In expanding our understanding of energy production to imported energy sources, we should also examine and program the development of certain branches of production that supply products for foreign trade in exchange for energy sources in short supply).

Nevertheless, even if we include this element, we still do not obtain a sufficiently complete picture of the economic elements that to a significant extent determine the possibilities for resolving energy problems. Obviously, in its broadest meaning, the concept of the enrgy complex can be extended to virtually the entire economy. There is no need to use such a formulation, although it is correct, since its actural usefulness is doubtful; if one wanted to cover and resolve everything at once, nothing would be resolved and nothing would be changed.

On the other hand, in light of what has been established with respect to energy losses from the utilization of inefficient energy generating equipment and inefficent equipment using energy, it is proper to include the branches producing this equipment in the energy complex. In the highest possible degree, this includes the branches of the electrical machinery industry, and also other branches from time to time and to varying degrees.

The designation of such branches is an issue for a separate analysis, which, as the basic criterion for selection, should use the effect of these branches on the so-called extended energy-intensiveness of production, and their actual consumption of energy.

The energy complex, defined in this manner, should be equipped with a program and with the funds necessary to resolve energy questions with a suitable breakdown into real resources (investments and technology, including imported technology), organizational resources, and economic resources. The realism of activities in the area described depends on awareness and determination of the factors in the direct and indirect effect on various energy elements situated throughout the entire economy. At the outset, one may adopt the principle of action that is aimed at many targets (various energy elements) and utilizes different methods.

The process that has been initiated of making outlays for energy more realistic was an important undertaking. At present, however, as indicated by the exploratory research conducted by GIGE in the first and second quarters of 1982, with an average doubling of the share of fuel and energy costs in the producer cost (the 1 January 1982 increase in prices), no increase in interest in making energy consumption more efficient was observed in the enterprises

studied. Within the enterprises, this is explained by stating that it was too early for the consequences of this economic action to appear, and that the enterprises were concentrating on the questions of supply and maintaining the continuity of production. Attention is called to the insufficient development of solutions, the lack of so-called executive regulations, lack of familiarity with the essence of the economic mechanisms, etc.

The situation in 1982 was really exceptional in view of the total disruption of economic equilibrium. It must be admitted, however, that even under the conditions of a fair equilibrium and tightened cost-effectiveness, economic resources, especially when the direct energy costs are low, may turn out to be an insufficient motive for conserving energy and overcoming the various barriers in this field.

Greater effects under the influence of economic resources may appear in the case of consumers such as households and individual agricultural farms, but also under the condition that solutions in the sphere of regulatory processes are supported in real processes, and that the availability of technical resources for conserving energy will be increased. GIGE is rightly warning against the use of norms for the consumption of energy and against taxing excessive energy consumption when there are no material and technical resources making it possible to conserve energy. The package of legal regulations prepared by GIGE corresponds to the approach to conserving energy that was presented earlier. These are drafts of a law on energy resources management; a Council of Ministers decree on the scope and manner for action by GIGE and local energy resources management inspectors; a Council of Ministers decree on the scope and manner for coordinating investments in the field of energy resources management; a GIGE order on the scope and manner for coordinating the production and importing of energy equipment, together with a list of equipment requiring a certificate from GIGE, in order to prevent the production of inefficient energy equipment.

In the area of legal regulations affecting the power industry (and other areas), Poland has good contemporary experience. The first regulation, in 1962, in principle covered all energy issues. The present draft is an improvement of it. Nevertheless, the use of these regulations, as it appears from our earlier considerations, has not yielded the anticipated results. Similar traditions in Polish planning can be observed in programs that are specialized and at the same time interbranch or intersector programs, such as the food program at the beginning of the 1970's, in which, among other things, an exhaustive formulation was made of the scope and concept of the food industry. This did not prevent a food crisis.

Formulation of the scope of the concept of any kind of economic complex, as well as a program for it, is a necessary beginning, but it does not solve anything by itself. This is also how we view the requirement for a mature definition of the energy complex. Leaving out of it the branches that manufacture energy equipment and consume energy can be said to amputate an essential segment of energy resources management from the outset. Regardless of this, further problems arise in practical application of the concept and program for the development of the energy complex in the economic process.

Success will depend on the effectiveness of the instruments used for the tasks arising from the program.

Power Industry, Counterdisintegration, and Particularism

The foremost enemies of implementation of programs that are specialized and at the same time interbranch ones are branch particularism, and the predominance of vertical dependences that have been established for decades. The production and consumption of energy is a problem that is being faced by its producers and by many users (e.g. iron-smelting). In other branches, including those manufacturing energy equipment, the scale of energy consumption is a secondary matter, or better stated, a matter for the consumers of their products. Improving the production of energy equipment from the standpoint of higher efficiency entails certain efforts and outlays, and is one of the tasks that the producer dealt with in the epoch of the predominance of vertical relationships, with his "own" vision of the development of the enterprise and the branch; this picture should be complete with the forces proper for the producer's market, in which the requirements of the consumers (to the extent that they were presented from the point of view of energy-intensiveness) have little effect on the producer.

A particular problem in energy resources management is balancing the energy budget, i.e. action with respect to supply and demand, and furthermore ensuring the conditions for economic growth. If a pool of funds is guaranteed for the development of energy production (with an erroneous concept of the energy complex, as this is presently being outlined), with a generally limited supply of funds, the resolution of the energy problems is likely to become more difficult. In other fields, on which energy conservation depends to a considerable extent, there is a strong tendency toward what in slang is called "shaking off" the tasks aimed at conserving energy, since funds are concerned, and they are only one of many tasks. That is what happened in the past, even though there were greater funds for development.

This is the reason for the conclusion confirming the advisability already expressed earlier of expanding the concept of the energy complex (and program); and the need -- if it becomes necessary to create a guaranteed pool of funds for development -- to cover not only energy producers, but also the branches determining energy conservation, and at least the principal manufacturers of energy equipment and equipment utilizing energy. The outlays for obtaining a unit of energy through conservation are lower than for producing it. This is understood to be one of the factors surmounting the various branch barriers and linking individual enterprises into a single chain, whichout which it is difficult to count on progress in energy resources management and the effectiveness of the entire economy.

The latter is one of the important tasks of the economic reform, which has to bring into existence economically strong horizontal links among economic units, and thus increase the effectiveness of management. The formation of such relationships requires some time, however.

Let Us Search For Realistic Points of Support

Immediate solutions, corresponding to the needs of the present situation, are therefore important. This has to do with creating for several purposes and utilizing a central pool of funds allocated for the purpose of resolving energy questions. Economic units operating for a long time in a command system are quite familiar with the paths to a central investment fund and the means of ensuring themselves a share in it. Since activity in this field is being maintained, there is nothing to conflict with organizing access to these funds in a comprehensive manner, covering various elements and measures for a dynamic balancing of the energy budget, or with thus stimulating horizontal links, in accordance with the reform.

Investments aimed either at producing energy or conserving it, financed from central funds or the funds of enterprises (as it appears today, it is especially important to set in motion and combine the latter) are inevitable in this field, just like the search for new methods to use them in combination with the entire set of noninvestment funds. The idea of the integral nature of tasks aimed at conserving energy will only become viable (and a real force) when it is supported by mechanisms and motives stimulating the activity of economic units.

In connection with the latter statements, I can state certain observations concerning the draft legal regulations that have been prepared and certain proposals for solutions that have been drawn up. The draft law on energy resources management undoubtedly expands the influence of GIGE (the central body) on this management and on interbranch coordination. It increases the resources for action, etc. We should mention the obligation of coordinating investments in energy resources management and certification by GIGE of the energy equipment produced. Coordination of investments and modernization is an important principle, which however can be effective only when the initiative for investment or modernization comes from economic units. The proper authority (GIGE) cannot only come forward with conclusions on this matter. Meanwhile, economic units that possess or are aspiring for the authorizations derived from the three S's are not providing guarantees (particularly in the present situation) that they will present initiatives for energy conservation.

The problem does not lie in having the investment or modernization recommendations of the central organ made mandatory. Today no one will fight for this. It is necessary to search for solutions with various motivations and equipped with various resources. Among other things, this applies to the understanding of the energy complex and to the programs for developing it, the creation and disposal of the pool of central funds (which was discussed above), the use of economic instruments (prices, tax breaks, etc.), combining funds for the production and conservation of energy, and participation in the results by the producer of energy and energy equipment, on one hand, and the user of the energy or equipment, on the other. These are questions that still require thorough analyses and both immediate and long-term solutions, in light of the economic reform. This is most necessary in the problems covering the last few years.

113. Paris Commune Memorial Shipyard in Gdynia
114. A. Warski Memorial Szczecin Shipyard in Szczecin
115. Ustka Shipyard in Ustka
116. Piston Ring Factory Fapit in Lodz
117. Motorized Equipment Plants Polmo in Praszka
118. Gasket Factory PZL-Morpak in Gdansk
119. Building Machinery Factory Bumar-Proma in Ostrowek Wegrowski
120. Building Machinery Factory Bumar-Famaba in Glogow
121. Warszawa Mechanical Plants PZL-WZM No 2 in Warszawa
122. Ball Bearing Factory PZL-Bimet in Gdansk
123. Communication Equipment Factory PZL-Warszawa II in Warszawa
124. Communication Equipment Factory PZL-Warszawa Okecie in Warszawa
125. Communication Equipment Factory PZL-Krakow in Krakow
126. Communication Equipment Factory PZL-Krosno in Krosno
127. Communication Equipment Factory PZL-Poznan in Poznan
128. Mechanized Household Equipment Plants Predom-Termet in Swiebodzice
129. Olkusz Glazed Utensil Factory in Olkusz
130. Building Machinery Factory Bumar-Koszalin in Koszalin
131. Technological Devices Plants Zgoda in Swietochlowice
132. Machinery and Equipment Factory Famak in Kluczbork
133. Warszawa Welding Equipment Factory Perun in Warszawa
134. Bielsko Textile Machinery Factory Befama in Bielsko-Biala
135. Lubsko Cotton Combing Factory Polmatex-Falbusz in Zielona Gora
136. Poznan Ball Bearing Factory in Poznan
137. M. Buczek Memorial Ball Bearing Factory in Krasnik
138. Ball Bearing Factory Iskra in Kielce
139. Ball Bearing Factory Prema-Milmet in Sosnowiec
140. Mechanical Devices Factory Poreba in Poreba
141. Machine Tool Factory Mechanicy in Pruszkow
142. Dolnoslask Metallurgical Plants Dozamet in Nowa Sol
143. Cast Iron Foundry Staporkow in Staporkow
144. Radom Foundry in Radom
145. Konskie Foundries in Konskie
146. Metallurgical Plants Przemkow in Przemkow
147. Cast Iron Foundry Wegierska Gora in Wegierska Gorka
148. Dolnoslask Foundries in Szprotawa
149. Pomorze Foundry and Glazery in Grudziadz
150. Cast Iron Foundry and Glazery Kamienna in Skarzysko-Kamienna
151. Boiler and Radiator Factory Fakora in Lodz
152. Cast Iron Foundry Gromadka in Gromadka
153. Grodzisk Radiator Factory in Grodzisk Mazowiecki
154. Electrometallurgical Plant Ema-Blachownia in Blachownia
155. Smelting Works Mala Panew in Ozimek
156. Metallurgical Plants Pomet in Poznan
157. Gliwice Technological Device Plants in Gliwice
158. Kozle Machinery Factory Kofama in Kedzierzyn-Kozle
159. Crane Equipment Factory in Minsk Mazowiecki
160. Opole Welding Apparatus Plants Ozas in Opole
161. Building Machinery Factory Bumar-Hydroma in Szczecin
162. Building Machinery Factory Bumar-Fadroma in Wroclaw
163. Aleksander Kowalski Memorial Warszawa Pump Factory in Warszawa

The same thing is true of certification of the energy equipment manufacture, and the possibility of prohibiting the production and use of inefficient equipment. The dilemmas that were after all known in the past come up here: to produce and install inefficient energy equipment, to serve temporarily until the elimination of the so-called narrow sections, or not to produce them at all.

A view is being expressed that in many developed countries, even those with a completely market economy, orders and prohibitions are utilized in energy, and that this should be even more possible in our economy. This is true. The thing is, however, that completely market economies are as a rule demand economies, while the Polish economy is struggling with supply. On the other hand, the use of reasonable orders has to be considered, if they are not to be morally used up or remain unworkable.

The investigation and resolution of the problems raised throughout this work requires a suitable stock of information on the production, conversion, and use of energy. As I have already stated, there are no statistics on the final energy or on efficiency in the consumption of it, something on which the greatest reserves should exist. Statistics on other energy fields are insufficient and hard to come by. As a rule (just as in regard to materials-intensiveness), limited amounts of such statistics are released.

It is difficult to find a reasonable justification, since the consequences of high outlays for production are culminating in a crisis that is astounding the world. If it is a question of saving public opinion from awareness of the poor state of affairs in this field, this is a mistake. Public opinion is riveted by the descriptions of wastefulness and stupidity that are provided to it by the mass news media.

Dissemination of statistics is easier, since they provide a more comprehensive and balanced picture. Above all, familiarization with them, study, etc., will elicit rational motives, and favor precisely such methods of counteracting the phenomena of high energy-intensiveness -- and in general, the intensiveness of outlays in management -- in all those who want, can, and should be concerned with this. High and well-established energy-intensivess will only be overcome by a massive, concentrated, and continuing mobilization, by constant pressure. The essential side of this mobilization is, among other things, the question of an interbranch, long-term program that would be a systematic foundation for subsequent activities dealing with the dimensions and availability of various resources.

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MORE FIRMS SUBJECT TO SPECIAL RESTRICTIONS UNDER NEW LAW

Warsaw MONITOR POLSKI in Polish No 13, 9 Apr 83 pp 137-143

[Article: "Cabinet Resolution No 30 of 14 March 1983 Dealing With Extension of Statutory Rules on Specific Legal Regulations During the Period of Martial Law Suspension for Certain National Enterprises"]

[Text] On the basis of article 2, act 3 of the 18 December 1982 statute on specific legal regulations during the period of martial law suspension (DZ. U. No 41, item 273) the Cabinet resolution follows:

1.1 There is an extension of the validity of the resolutions of article 2, act 1 of the 18 December 1982 statute on detailed legal regulations during the period of martial law suspension (DZ. U. No 41, item 273) [Pursuant to which employees are permitted to resign from their jobs only with the consent of management; if management refuses to approve an employee's resignation request, the employee may appeal such decision to a higher authority] for national enterprises manufacturing products included in operational programs and implementing duties imposed upon them on the basis of article 54 of the statute of 25 September 1981 regarding national enterprises (DZ. U. of 1981, No 24, item 122 and of 1982 No 45, item 289).

2. Register of national enterprises which is referred to in statute 1, represents a supplement to the resolution.

The resolution goes into effect on the day it is announced.

President of the Cabinet: Army General W. Jaruzelski

Register of national enterprises manufacturing products covered by operational programs and implementing tasks imposed on them on the basis of article 54 of the statute regarding national enterprises.

I. Construction and Building Materials Industry Enterprises

1. Gliwice Industrial Construction Enterprise in Gliwice
2. Katowice Engineering Works Industrial Construction Enterprise "Hydrobudowa--Slask 1" in Katowice
3. Marine Hydrotechnological Construction Enterprise "Engergopol 4" in Gdansk
4. Gdynia Industrial Construction Enterprise in Gdynia
5. Poznan Industrial Construction Enterprise No 1 in Poznan

6. Poznan Industrial Construction Enterprise No 2 in Poznan
7. Poznan Engineering Works Industrial Construction Enterprise "Hydrobudowa" in Poznan
8. Opole Industrial Construction Enterprise No 1 in Opole
9. Tarnobrzeg Industrial Construction Enterprise in Tarnobrzeg
10. Kielce Industrial Construction Enterprise in Kielce
11. Krakow Industrial Construction Enterprise "Krakbud" in Krakow
12. Gliwice Municipal Engineering Syndicate in Gliwice
13. Katowice Municipal Engineering Synidicate in Katowice
14. Sosnowiec Engineering Works Enterprise in Sosnowiec
15. General Building Syndicate "Zaglebie" in Sosnowiec
16. Building Syndicate in Chorzow
17. General Construction Syndicate "ROW" in Rybnik
18. Building Syndicate--"Katowice" in Katowice
19. Building Syndicate--Bytom in Bytom
20. General Construction Syndicate "GOP" in Tychy
21. Building Syndicate in Gliwice
22. Chrzanow Building Enterprise in Chrzanow
23. General Construction Enterprise in Dabrowa Gornicza
24. Olkusz Building Enterprise in Olkusz
25. Raciborz Building Enterprise in Raciborz
26. Zawiercie Building Enterprise in Zawiercie
27. Czechowice Building Enterprise in Czechowice
28. Katowice Sanitary Installation Enterprise in Katowice
29. Gliwice Sanitary Installation Enterprise in Gliwice
30. Gliwice Electrical Installation Enterprise in Gliwice
31. Bytom Elevation and Finishing Works Enterprise in Bytom
32. Katowice Industrial Construction Enterprise in Katowice
33. Myslowice Engineering and Industrial Construction Enterprise in Myslowice
34. Sosnowiec Industrial Construction Enterprise in Sosnowiec
35. Wodzislaw Industrial Construction Enterprise in Wodzislaw Slaski
36. Engineering Works Enterprise in Tychy

II. Metallurgy and Machinery Industry Enterprises

1. Agromet Farm Machinery Factory in Brzeg on the Odra River
2. Agromet-Dolzamet Fram Machinery Factory in Chojnow
3. Agromet Fram Machinery Factory in Czarna Bialostocka
4. Agromet-Warfama Warnice Farm Machinery Factory in Dobre Miasto
5. Malleable Cast Iron Foundry "Drawski Mlyn" in Drawski Mlyn
6. Malleable Cast Iron Foundry "Drezdenko" in Drezdenko
7. Agromet-Unia Farm Machinery Factor in Grudziadz
8. Agromet-Inofama Farm Machinery Factory in Inowroclaw
9. Agromet Ironworks and Farm Machinery Plants in Jawor
10. Agromet Farm Machinery Factory in Kunowo
11. Agromet-Kraj Farm Machinery Factory in Kutno
12. Agromet Farm Machinery Syndicate in Lublin
13. M. Nowotka Memorial Harvesting Machinery Factory Agromet in Plock
14. Agromet Poznan Harvesting Machinery Factory in Poznan
15. Agromet-Rofama Farm Machinery Factory in Rogozno
16. Agromet Metallurgical Works of the Farm Machinery Industry in Kutno
17. Agromet-Famarol Farm Machinery Factory in Slupsk

18. Agromet Farm Machinery Factory in Strzelce Opolskie
19. Agromet-Archimedes Farm Machinery Factory in Wroclaw
20. Agromet-Pilmet Farm Machinery Factory in Wroclaw
21. Tractor Industry Association Ursus in Warszawa (all association plants)
22. Bialystok Food Machinery and Equipment Plants in Bialystok
23. Bydgoszcz Food Machinery and Equipment Industry Factory Spomasz in Bydgoszcz
24. Pleszew Food Industry Machinery Factory Spomasz in Pleszew
25. Food Industry Machinery and Equipment Factory Spomasz in Wronki
26. Food Industry Machinery and Equipment Factory Spomasz in Belzyce
27. Food Industry Machinery and Equipment Factory Spomasz in Ostrow Wielkopolskie
28. Food Industry Machinery and Equipment Factory Spomasz in Znin
29. Food Industry Machinery and Equipment Manufacturing Plant Spomasz in Olsztyn
30. Poznan Packaging Machinery Factory Spomasz in Poznan
31. Dairy Machinery Factory Spomasz in Warsaw
32. Packaging Machinery and Equipment Factory Spomasz in Gniezno
33. Torun Mill Equipment Plants Spomasz in Torun
34. Food Industry Machinery and Equipment Factory in Zary
35. Wroclaw Food Industry Machinery and Equipment Factory in Wroclaw
36. Lublin Scale Factories Spomasz in Lublin
37. Lodz Metal Plants Spomasz in Lodz
38. Bydgoszcz Refrigeration Equipment Factory in Bydgoszcz
39. Scientific-Production Center for Semiconductors (all production units)
40. Scientific-Production Center for Subassemblies and Electronic Equipment Unitra-Dolam (all production units)
41. Scientific-Production Center for Electronic Materials (all production units)
42. Scientific-Production Center for Hydra Microelectronics and Resistors Unitra-Telpod (all production units)
43. Radio Ceramic Plants Cerad in Warszawa
44. Magnetic Material Plant Polfer in Warszawa
45. Radio Subassembly Factory Elwa in Warszawa
46. Radio Subassembly Plant Omig in Warszawa
47. Radio Transformer Plants in Skierniewice
48. Technological Machinery and Equipment Plants in Warszawa
49. Radio Subassembly Plants Miflex in Kutno
50. Electron Plants Unitra-Koral in Torun
51. Kinescope Plants Unitra-Polkolor in Piaseczna
52. Bialystok Television Subassembly Plants Unitra-Biazet in Bialystok
53. Technological Equipment Construction Plants Unitra-Elmasz in Warszawa
54. Electron Plants Lamina in Piaseczna
55. Scientific-Production Professional Electronic Center Unitra-Radwar (all production units)
56. Radio Plants Radmor in Gdynia
57. M. Kasprzak Memorial Radio Plants in Warszawa
58. Radio Plants Diora in Dzierzoniow
59. Gdansk Electronic Plants Unimor in Gdansk
60. Lubsko Electrical Apparatus Plants Mera-Lumel in Zielona Gora
61. Krakow Cable and Cable Machinery Factory in Krakow
62. M. Buczek Memorial Bydgoszcz Cable Factory in Bydgoszcz
63. M. Buczek Memorial Cable Factory in Ozarow

64. Slask Cable Factory in Czechowice-Dziedzice
65. Cable Factory Zalom in Szczecin
66. Energy Lines Factory in Bedzin
67. Nawojowa Conductor Factory Elpena in Legnica
68. Lighting Equipment Plants Polam-Pila in Pila
69. Pabianice Lightbulb Factory Polam-Pabianice in Pabianice
70. Slask Electric Lamp Factory Polam-Katowice in Katowice
71. Rzeszow Pack Lamp Plant Polam-Rzeszow in Rzeszow
72. R. Luksemburg Memorial Electrical Lamp Manufacturing Plants Polam in Warszawa
73. Consolidated Electrochemical Plants Ema-Centra in Poznan
74. Battery Plants Ema-Zap in Piastow
75. Battery Repair and Maintenance Plants Ema-Zrida in Warszawa
76. Czarnkow Electrochemical Plants in Czarnkow
77. Cell and Battery Manufacturing Plants Ema-Volta in Wroclaw
78. Starogard Electrochemical Plants Ema-Elektron in Starogard Gdansk
79. Communication Equipment Factory PZL-Mielec in Mielec
80. Communication Equipment Factory PZL-Swidnik in Swidnik
81. Communication Equipment Factory PZL-Rzeszow in Rzeszow
82. M. Nowotka Memorial Mechanical Plants PZL-Wola in Warszawa
83. Communication Equipment Factory PZL-Kalisz in Kalisz
84. Mechanical Equipment Factory PZL-Krotoszyn in Krotoszyn
85. Standard Hydraulic Power Components Syndicate PZL-Hydral in Wroclaw
86. Communication Equipment Factory PZL-Gorzyce in Gorzyce
87. Filter Factory PZL-Sedziszow in Sedziszow
88. Smelting Works Stalowa Wola in Stalowa Wola
89. Compact Automobile Factory Polmo in Bielsko-Biala
90. Mechanical Appliance Syndicate Bumar-Labedy in Gliwice
91. F. Dzierzynski Memorial Building Machines and Locomotive Factory Bumar-Fablok in Chrzanow
92. Excavator and Hydraulic Plants Bumar-Warynski in Warszawa
93. Mechanical Plants Tarnow in Tarnow
94. Truck Factory Polmo in Starachowice
95. Specialized Auto Factory Polmo-SHL in Kielce
96. Jelcz Auto Plants Polmo in Jelcz in the vicinity of Olawa
97. Truck Factory Polmo in Lublin
98. Sanok Bus Factory Polmo-Autosan in Sanok
99. Delivery Van Factory Polmo in Nysa
100. Auto Accesories Factory Polmo in Lodz
101. Auto Assembly Factory Polmo in Szczecin
102. Auto Transmission Factory Polmo in Tczew
103. Friction Disk Factory Polmo in Marki
104. High Compression Engine Factory Andoria in Andrychow
105. Mechanized Electrotechnology Plants in Swidnica
106. Passenger Car Factory Polmo in Warszawa
107. Railway Car Factory Swidnica in Swidnica
108. H. Cegielski Metal Industry Plants in Poznan
109. Myszkow Metallurgical Plants Mystal in Myszkow
110. Railway Car Factory Pafawag in Wroclaw
111. Chorzow Steel Construction Factory Konstal in Chorzow
112. M. Nowotka Memorial Beyond the Oder Metal Industry Plants Zastal in Zielona Gora

164. Swidnica Industrial Equipment Factory in Swidnica
165. Kielce Pump Factory Bialogon in Kielce
166. Wire and Wire Products Factory in Gliwice
167. Screw Factory in Zywiec
168. Slask Rope and Wire Plants Linodrut in Zabrze
169. Paris Commune Memorial Industrial Plants in Radomsko
170. Metal Products Plants in Dabrowa Gornicza
171. Bielsko Screw Products Factory Bispol in Bielsko-Biala
172. Tinware Factory in Malomice
173. Rybnik Metalware Plants Huta Silesia in Rybnik
174. Smelting Works Bobrek in Bytom
175. Smelting Works Kosciuszko in Chorzow
176. Smelting Works Labedy in Gliwice
177. Smelting Works 1 May in Gliwice
178. Smelting Works Ferrum in Katowice
179. Smelting Works Laziska in Laziska Gorne
180. Smelting Works Pokoj in Ruda Slaska
181. Smelting Works Zawiercie in Zawiercie
182. K. Swierczewski Memorial Smelting Works in Zawadzkie
183. Smelting Works Zygmunt in Bytom
184. Lenin Memorial Metallurgical Smelting Works Syndicate (all plants)
185. Katowice Metallurgical Smelting Works Syndicate (all plants)
186. Coke Syndicate Zabrze in Zabrze
187. Sadecki (Sacz) Electro-Coal Plants in Nowy Sacz
188. Coke Plants Walbrzych in Walbrzych
189. Smelting Works Siechnice in Siechnice
190 Dolomite Plants Bytom in Bytom
191. Chrzanow Nonflammable Material Plants in Chrzanow
192. Nonflammable Raw Material Plants in Trzebina
193. Mine and Quartzite Washing Plant Bukowa Gora in Laczna
194. Smelting Works Szczecin in Szczecin
195. Smelting Works Zabrze in Zabrze
196. Mechanical Plants Zamet in Tarnowskie Gory
197. Czestochowa Nonflammable Material Plants in Czestochowa
198. Gliwice Nonflammable Material Plants in Gliwice
199. Skawina Nonflammabel Material Plants in Skawina
200. Opoczno Nonflammable Material Plants in Opoczno
201. Radom Nonflammable Material Plants in Radom
202. Jaroszow Nonflammable Material Plants in Jaroszow
203. Magnesium Plants Ropczyce in Ropczyce
204. Dolnoslask Magnesium Plants in Swidnica
205. Mechanical Instrument Factory Ponar-Ostrzeszow in Ostrzeszow
206. Katowice Metal Products Plants in Katowice
207. Machine Construction Syndicate Czestochowa in Klobuck
208. Electronic Measuring Apparatus Experimental-Production Enterprise Eureka in Warszawa
209. Shipyard Wisla in Gdansk
210. Ostroda Ship Plants in Ostroda
211. Ship Equipment Plants Zezamor in Slupsk
212. Gen Walter Memorial Metal Plants Lucznik in Radom
213. Electrical Apparatus Plants Mera-Refa in Swiedbodzice

III. Chemical and Light Industry Enterprises

1. F. Dzierzynski Memorial Cotton Industry Plants in Lodz
2. Widzow Cotton Industry Plants 1 May in Lodz
3. Gen Walter Memorial Cotton Mill in Lodz
4. Z. Modzelewski Memorial Czestochowa Cotton Industry Plants Ceba in Czestochowa
5. Bogatynia Cotton Industry Plants Doltex in Bogatynia
6. Torun Worsted Spinning Mill Merinotex in Torun
7. People's Guard Memorial Worsted Spinning Mill Polmerino in Lodz
8. Worsted Spinning Mill Arelan in Lodz
9. Analine Worsted Spinning Mill Polanil in Lodz
10. H. Sawicki Memorial Worsted Spinning Mill Waldoro in Bielsko-Biala
11. Maria Koszutska Memorial Worsted Spinning Mill Elanex in Czestochowa
12. Worsted Spinning Mill Welnopol in Czestochowa
13. A. Kowalczyk Memorial Worsted Spinning Mill Intertex in Sosnowiec
14. Sosnowiec Worsted Spinning Mill Politex in Sosnowiec
15. Jelenia Gora Worsted Spinning Mill Anilux in Jelenia Gora
16. Zagan Wool Combing Works Poltops in Zagan
17. Linen Industry Plants Skarbkow in Mirsk
18. Klodzko Linen Industry Plants Lech in Oldrzychowice
19. Linen Industry Plants Vigolen in Gluszyna
20. Linen Industry Plants Lenko in Bielsko-Biala
21. Czestochowa Linen Industry Plants Stradom in Czestochowa
22. Nowa Sol Thread Factory Odra in Nowa Sol
23. H. Sawicki Memorial Widzow Threat Factory Ariadna in Lodz
24. Silk Industry Plants Pierwsza in Lodz
25. Technological Fabrics Plants Eskord in Ilowa Zaganska
26. Dolnoslask Technological Rope and Cord Factory Defalin in Swiebodzice
27. Bielsko Cord and Belt Plants Bezalin in Bielsko-Biala
28. Technological Clothing Plants Gumownia in Trzebinia
29. Lubawa Technological Clothing Plants in Lubawa
30. Gen W. Sikorski Memorial Pabianice Technological Fabric Plants in Pabianice
31. M. Kasprzak Memorial Zyrardow Technologial Fabric Plants--Zapole Division near Grodzisk Mazowiecki
32. Pabianice Dressing Machinery Plants in Pabianice
33. Torun Dressing Materials Plants in Torun
34. Czechowice Dressing Materials Plants in Czechowice-Dziedzice
35. Knitting Industry Plants Wola in Zdunska Wola
36. Hosiery Industry Plants Syntex in Lowicz
37. Hosiery Industry Plants Stella in Zyrardow
38. Knitting Indusry Plants Mewa in Bilgoraj
39. Knitting Industry Plants Diana in Sulechow
40. Knitting Industry Plants Koral in Mysliborz
41. Knitting Industry Plants Watra in Lubawka
42. Knitting Industry Plants Hanka in Legnica
43. Knitting Industry Plants Trawena in Trawniki
44. T. Duracz Memorial Knitting Industry Plants Delata in Lodz
45. P. Finder Memorial Knitting Industry Plants Pafino

46. Hosiery Industry Plants Zenit in Lodz
47. Hosiery Industry Plants Feniks in Lodz
48. Hosiery Industry Plants Sandra in Aleksandrow Lodzki
49. Knitting Industry Plants Opolanka in Opole
50. Knitting Industry Plants Unia in Glubczyce
51. M. Nowotka Memorial Knitting Industry Plants--Sigmatex in Piotrkow Trybunalski
52. Knitting Industry Plants Karo in Siedlice
53. Knitting Industry Plants Wola in Zdunska Wola
54. Wroclaw Worsted Spinning Mill Weltex in Wroclaw
55. Clothing Industry Plants Confex in Jelenia Gora
56. Clothing Industry Plants Rafio in Walbrzych
57. Bialystok Shoe Plants in Bialystok
58. Leather Goods Plant Tomskor in Tomaszow Mazowiecki
59. Lukow Leather Industry Plants Luk-But in Lukow
60. Nowy Targ Leather Industry Plants Podhale in Nowy Targ
61. Slask Leather Industry Plants Otmet in Krapkowice
62. Dolnoslask Leather Industry Plants Odra in Olesnica
63. Radom Leather Industry Plants Radoskor in Radom
64. Bielsko Shoe Plants Befado in Bielsko-Biala
65. Baltic Leather Industry Plants Neptun in Starogard Gdanski
66. Leather Industry Northern Plants Alka in Slupsk
67. Lodz Leather Industry Plants Skogar in Lodz
68. Lubow Leather Industry Plants Carina in Gubin
69. Wielkopolskie Shoe Plants Polonia in Gniezno
70. Skarzysko Leather Industry Plants Fosko in Skarzysko-Kamienna
71. Pomorze Leather Industry Plants Kobra in Bydgoszcz
72. Rzeszow Leather Industry Plants Respan in Rzeszow
73. Warszawa Leather Industry Plants Syrena in Warszawa
74. Nowa Sol Shoe Plants Junior in Nowa Sol
75. Augustowo Shoe Plants in Augustowo
76. Zlotorja Shoe Plants in Zlotorja
77. Siemiatycze Shoe Plants in Siemiatycze
78. Shoe Plants in Strzegom
79. Poznan Shoe Plants Domena in Poznan
80. Bydgoszcz Shoe Plants Brda in Bydgoszxz
81. Chelmo Polish Committee for National Liberation [PKWN] Memorial Shoe Plants in Chelmo
82. M. Fornalski Memorial Fancy Goods Plants Wagmet in Lodz
83. Chemical Plants Oswiecim in Oswiecim
84. Paul Finder Memorial Nitric Plants in Chorzow
85. M. Nowotka Memorial Sulphur Mines and Processing Plants Siarkopol in Tarnobrzeg
86. Inorganic Industry Assembly Works Enterprise Montokwas in Katowice
87. Dye Industry Plants Organika-Boruta in Zgierz
88. Chemical Plants Organika-Azot in Jaworzno
89. Bydgoszcz Photochemical Plants Organika-Foton in Bydgoszcz
90. Warszawa Photochemical Plants Organika-Foton in Warszawa
91. Chemical Fiber Plants Chemitex-Stilon in Gorzow Wielkopolski
92. Chemical Fiber Plants Elana in Torun
93. Chemical Fiber Plants Chemitex-Wistom in Tomaszow Mazowiecki

94. Chemical Fiber Plants Chemitex-Wiskord in Szczecin
95. Chemical Fiber Plants Chemitex-Anilana in Lodz
96. Chodakow Chemical Fiber Plants Chemitex in Sochaczew
97. Klement Gottwald Memorial Chemical Fiber Plants Chemitex-Celwiskoza in Jelenia Gora
98. Wroclaw Chemical Fiber Plants Chemitex in Wroclaw
99. Tarchomin Pharmaceutical Plants Polfa in Warszawa-Tarchomin
100. Pabianice Pharmaceutical Plants Polfa in Pabianice
101. Starogard Pharmaceutical Plants Polfa in Starogard Gdanski
102. Jelenia Gora Pharmaceutical Plants Polfa in Jelenia Gora
103. Poznan Pharmacuetical Plants Polfa in Poznan
104. Krakow Pharmaceutical Plants in Polfa in Krakow
105. Grodzisk Pharmaceutical Plants in Grodzisk Mazowiecki
106. Warszawa Pharmaceutical Plants Polfa in Warszawa
107. Kutno Pharmaceutical Plants Polfa in Kutno
108. Lodz Pharmaceutical Plants Polfa in Lodz
109. Rzeszow Pharmaceutical Plants Polfa in Rzeszow
110. Lublin Pharmaceutical Plants Polfa in Lublin
111. Kujawy Pharmaceutical Plants Polfa in Aleksandrow Kujawski
112. Boleslawiec Vial and Ampule Factory Polfa in Boleslawiec Slaski
113. Lodz Rubber Industry Plants Stomil in Lodz
114. Grudziadz Rubber Industry Plants Stomil in Grudziadz
115. Fancy Rubber Goods Industry Plants Stomil in Lodz
116. Technological Fabric Plants Stomil in Zawiercie
117. Sanok Rubber Industry Plants Stomil in Sanok
118. Krakow Soda Plants in Krakow
119. Krakow Inorganic Industry Plants Bonarka in Krakow
120. Chemical Plants Tarnowskie Gory in Tarnowskie Gory
121. Chemical Plants Rudniki in Rudniki
122. Chemical Plants Police in Police
123. Wroclaw Inorganic Industry Plants in Wroclaw
124. Szczecin Phosphate Plants in Szczecin
125. Phosphate Factory Ubocz in Ubocz
126. Torun Inorganic Industry Plants Polchem in Torun
127. Debica Automobile Tire Plants Stomil in Debica
128. Chemical Plants Organika-Zachem in Bydgoszcz
129. Studzianki Heroes Memorial Paint Materials Plant in Pionki
130. Plastic Plants Nitron-Erg in Krupski Mlyn
131. Chemical Equipment Plants Metalchem in Koscian
132. Technological Clothing Plants Polnam in Czestochowa

IV. Remaining Enterprises

1. Raw Road Stone Material Mines in Wroclaw
2. Signal Equipment Manufacturing Plants in Katowice
3. Commercial-Technological Fire and Safety Equipment Enterprise in Bialystok
4. Commercial-Technological Fire and Safety Equipment Enterprise in Bydgoszcz
5. Commerical-Technological Fire and Safety Equipment Enterprise in Gdynia
6. Commercial-Technological Fire and Safety Equipment Enterprise in Katowice
7. Commercial-Technological Fire and Safety Equipment Enterprise in Krakow
8. Commercial-Technological Fire and Safety Equipment Enterprise in Kielce
9. Commercial-Technological Fire and Safety Equipment Enterprise in Lublin

10. Commercial-Technological Fire and Safety Equipment Enterprise in Lodz
11. Commercial-Technological Fire and Safety Equipment Enterprise in Olsztyn
12. Commercial-Technological Fire and Safety Equipment Enterprise in Opole
13. Commercial-Technological Fire and Safety Equipment Enterprise in Poznan
14. Commercial-Technological Fire and Safety Equipment Enterprise in Rzeszow
15. Commercial-TechnologicalFire and Safety Equipment Enterprise in Szczecin
16. Commercial-Technological Fire and Safety Equipment Enterprise in Warszawa
17. Commercial-Technological Fire and Safety Equipment Enterprise in Wroclaw
18. Commerical-Technological Fire and Safety Equipment Enterprise in Zielona Gora
19. Serum and Vaccine Plant in Warszawa
20. Serum and Vaccine Plant in Krakow
21. Serum and Vaccine Plant in Lublin
22. Warszawa Orthopedic Equipment Plants in Warszawa
23. Katowice Orthopedic Equipment Plants in Katowice
24. Poznan Orthopedic Equipment Plants in Poznan
25. Krakow Orthopedic Equipment Plants in Krakow
26. Health Shoe Plants in Szczercow
27. National Radio and Television Plants Enterprise Zarat in Warszawa
28. Paris Commune Memorial Telephone Equipment Manufacturing Plants Telkom-ZWUT in Warszawa
29. Teleelectronic Plants Telkom-Telfa in Bydgoszcz
30. Gen K. Swierczewski Memorial Wielkopolski Teleelectronic Plants Telkom-Teletra in Poznan
31. National Teletransmission Plants Telkom-PZT in Warszawa
32. Radom Telephone Works Telkom-RWT in Radom
33. Krakow Teleelectronic Plants Telkom-Telos in Krakow
34. Teleelectronic Equipment Assembly Enterprise Telkom-Telmont in Warszawa
35. Research Project Teleelectronic Industry Center Telkom-Telpro in Warszawa
36. Gdansk Teleelectronic Plants Telkom-Telmor in Gdansk
37. Teletechnological Subassembly and Equipment Plants Telkom-Telcza in Czaplinek
38. Teleelectronic Equipment Manufacturing Plants Telkom-Telcent in Kobylka
39. Feeder Telecommunication Equipment Plants Telkom-Telzas in Szczecinek
40. Automobile Transportation Union Enterprise No 1 in Warszawa
41. Automobile Transportation Union Enterprise No 2 in Warszawa
42. Automobile Transportation Union Enterprise No 3 in Bydgoszcz
43. Automobile Transportation Union Enterprise No 4 in Gdansk
44. Automobile Transportation Union Enterprise No 5 in Krakow
45. Automobile Transportation Union Enterprise No 6 in Lublin
46. Automobile Transportation Union Enterprise No 7 in Lodz
47. Automobile Transportation Union Enterprise No 8 in Olsztyn
48. Automobile Transportation Union Enterprise No 9 in Poznan
49. Automobile Transportation Union Enterprise No 10 in Katowice
50. Automobile Transportation Union Enterprise No 11 in Szczecin
51. Automobile Transportation Union Enterprise No 12 in Wroclaw
52. Subsidiary Automobile Transportation Union Enterprise in Ostrow Wielkopolski
53. Cable Line Construction Enterprise in Warszawa

9951
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COAL INDUSTRY OPERATING DEFICIT QUESTIONED

Warsaw POLITYKA in Polish No 24, 11 Jun 83 p 8

[Article by Slawomir Popowski: "Deficit Real of Apparent?"]

> [Text] The mining industry of pit-coal, the national industry, thanks to which we gradually started working our way out from the depths of the crisis, is...a losing industry, to which we must contribute. The costs of the excavation of pit-coal are more or less 10 percent higher than its market price and are continually growing. This causes the fact that the mining industry must use considerable and ever-greater subsidies from the state budget. To keep strictly to economic rules, each increase in the excavation of coal should be treated as a harmful and wasteful activity, and in the conditions of a market economy this industry should have long ago gone bankrupt. Fortunately, nobody would venture today to close down unprofitable mines. The question is, however, are we really contributing money to this interest.

The problem of the deficit of the mining industry is not new. For a long time the state has had to contribute to the excavation of pit-coal. This resulted from the policy of prices used during the whole postwar period. Pit-coal as one of the products having fundamental importance for the costs of production and the costs of living of the population always was counted among the products on which official prices were fixed. All successive changes in supply prices started from the price of coal, and the influence of the price increase of coal on the rest of the supply products was as a rule taken into account and at the same time the secondary influence of the increase of supply prices on the prime cost of the coal-mining industry was omitted or only partly taken into account.

It is still necessary to add that the periodic changes of coal prices were most often not synchronized with changes in the finance systems or wage controls, causing the increase of the prime costs. In turn in the coal industry the regulating of remunerativeness, for example, by manipulating the assortment structure (as was often done in manufacturing industries) is not possible, and the objective process of the constantly worsening of

mining-geological conditions causes a systematic increase in the costs of excavation.

In effect the deficit of the coal mining industry was constantly growing. In the decade of 1971-80 the average price of coal increased not much over 34 percent, while the costs per piece of the excavation increased about 131 percent. In 1980 the total prime costs of the coal industry were about 73 percent higher than profits from the sale of coal.

Let us add that such a price policy had a repercussion as a matter of fact on the whole energy economy. First of all with low market prices the carriers of manufactured energy were correspondingly cheaper, and as a consequence the contribution of the energy in the costs of the manufacturing industry was so small that it practically was not worthwhile to conserve it. Besides this the lowered price of energy and fuels led to deformation of the calculation of the effectiveness of international trade artifically lifting the profitability of the export of many energy-absorbing products.

The increase of supply prices introduced at the beginning of last year, including also a 300 percent increase in the price of coal, was to equalize the disproportions and lead to the liquidation of the budget subsidies. It did not happen that way, at least in the case of pit-coal. Even before the increase the department of the mining industry turned to the office of prices with the opinion that the proposed prices of coal are still too low and the mining industry will be threatened by a deficit. It was recognized, however, that in the conditions of that time it was not possible to introduce greater price hikes. As a result already at the end of 1982, that is 12 months after the price rise, the mining of pit-coal again became unremunerative.

As it was stated in the departmental treatise, "Evaluation of the Economic Results of the Pit-Coal Industry in 1982," the previous year was the first in which the mining industry, similarly to the whole economy, was to work according to the rule of self-financing. The initiation of this rule in the coal industry, however, turned out to be impossible. "As a result of the assigntion of official market prices of coal on a level lower than a level resulting from the assumptions of the economic reform and not even covering its prime costs," as stated in the previously mentioned document, "the subsidizing of the mines from the budget of the state and the suspension for 3 years of the repayment of some investment credits drawn before 1982 became once more necessary. Consequently this caused the apparent unremunerativeness of pit-coal with all its negative economic and social consequences."

The gist of the matter lies in this that from the start the new prices of coal were fixed inconsistently with the rules of the economic reform. In relation to coal, as with other basic raw materials, the so-called world prices, that is obtained in trade with nonsocialist countries, were to be operative. If then one is consistently to hold to the rules specified in the bill of prices, a ton of coal ought to cost 3,584 zlotys, whereas it costs 1,858 zlotys (speaking of market prices).

It does not even cover the cost of excavation, which amounts to over 3,013 zlotys. As a result last year it was necessary to contribute 81 billion zlotys from the state budget to the coal mining industry.

In reality this deficit was considerably lower. We exported after all to the second region of the world over 15 million tons of coal, for which the foreign trade collected $970 million, paying the mining industry only 30 billion zlotys. That is, the "profit" of the foreign trade amounted to over 52 billion zlotys. This sum flowed into the state budget.

If one in addition takes into account the exemption of the mines from some taxes and payments (by reason of the recognition of the mining industry as a branch of public utilities) the final subsidy to the mining industry amounted to 14.4 billion zlotys. That much, according to the evaluation of the department, the state budget had to contribute in reality to coal. This is indeed less than in previous years, but in no way changes the fact that the contribution was, however, necessary.

Such was last year's settlement of accounts. Presently it is necessary first of all to reckon with the further rise in the costs of excavation. The increase of supply prices "returned" to the mining industry. For new mining machines the mines are paying more than a year ago, and these are often stipulated prices and not infrequently nearly monopolistic. The finance system also changed. Some taxes, insurance premiums and expenses for the protection of the environment rose. The tables of fares, paid by the mining industry for the transport of coal, also rose several times. Altogether it is calculated that the cost of excavation will amount in this year to nearly 2,500 zlotys per ton.

If then the up to the present market prices of coal and the rules for the settlement of accounts of the mining industry are kept, the deficit will continually grow.

A radical way for the cancellation of the subsidizing of the mining industry would be a general increase in the market prices of coal, which by the obligatory foreign currency rate of exchange amounts to around 4,000 zlotys. The department even maintains that with their proper assignation, i.e. in accordance with the bill of prices, the pit-coal mining industry would be able to achieve a profit of 289 billion zlotys, from which sum the budget would get profits in virtue of income and stabilization tax in the amount of 244 billion zlotys. There is, however, little probability that the authorities would now decide on such a drastic change in the prices of coal, especially since this would have to result in successive rises practically speaking in almost all supply and market prices. In this situation it is only possible to think about a moderate increase in prices, in the boundaries of 15-20 percent, which indeed brings the price of coal to an economically justified level, but does not solve the problem of the deficit of the mining industry.

There is of course still one more possibility for the diminishing of the subsidy for pit-coal mines: the lowering of the costs of excavation. The

effects of these actions can not be as big as one might wish. It is necessary necessary to dig for coal ever deeper which every year increases the costs of excavation around 4 percent. It is also necessary to take into consideration the rules of the rational economy of lodes, and also the expenses for the rebuilding of the communal infrastructure in mining regions. To tell the truth it would be possible at present to think only about the restraint of the uncontrolled increase of the stipulated prices on machines and mining installations, but so far this is only a pious wish.

What then is the way out? It is necessary to consistently hold to the rules of the new economic system. As long as in reference to the prices of the basic raw materials we have decided on the formula of world prices, it ought to be respected. If not immediately, then step by step it is necessary to bring internal prices to this level (which, let us add, does not mean in every case a price rise).

One also should not play up the subject of the unremunerativeness of coal. If one takes into consideration only the returns of the export to the second region of the world and one converts it not according to the obligatory rate of exchange of the dollar, but according to real prices, for which goods bought for exported coal are sold, the whole problem of the deficit could turn out to be only apparent. And there is after all also the export to socialist countries and here the calculation also speaks in favor of coal.

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IMPACT OF MARTIAL LAW, WESTERN SANCTIONS ON 'LOT' AIRLINE REVIEWED

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[Article by Henryk Zwirko]

[Text] Air transport, which deals primarily in international transport, is a very sensitive index of the economic situation in the world. Its worsening was immediately felt by the airline communications enterprises. Competition, which--in the "open sky" policy implemented by the U.S.--led to operating in the red for many and even for the majority of air carriers, intensified. Laker, dynamically extending inexpensive carriers across the Atlantic until very recently, went bankrupt. Braniff--one of the largest U.S. airline transport enterprises--went bankrupt. Government interventions were necessary so that some large firms could survive. As the report of the International Air Transport Association [IATA] shows, barely a few enterprises are operating with satisfactory results.

The Polish Airlines 'LOT' also felt the effects of the world recession. Set on top of all this yet, was the unusually complicated socioeconomic situation of Poland. Together with the wave of unrest passing through our country, 1980 brought an unquestionable reduction in transport by the enterprise 'LOT.' A further slump occurred in 1981. The number of passengers transported by our planes, which amounted to 1,993,000 in 1979, shrank to 1,828,000 in 1980, and to 1,711,000 in 1981. The major portion of general transport operations also decreased by a similar degree: from 263,000,000 tkm to 258,000,000 tkm, and 236,000,000 tkm respectively.

The year 1982 was a special period for our civil airlines. For the first time since 1945, restoration of air traffic was begun practically from zero. The introduction of martial law brought about a complete immobilization of air transporation, both domestic and international; and airports were also closed to planes from foreign companies. This halting of air traffic had not only temporary, but also far-reaching consequences. After all, the implementation of earlier coordinated flight schedules, coordinated frequencies of communication and, in connection with this, the freight capacity [which was bidded for], was abandoned. These issues are coordinated with foreign partners. A gradual resumption of air service on international routes thus demanded negotiations with our partners in the matter of the conditions for renewed service, in consideration of the new, considerably altered conditions.

In the first period, charter flights were resumed. These flights were to enable or to facilitate a return to the country by Poles--whom the announcement of martial law found abroad--as well as the leaving of Poland by foreigners who expressed such a desire.

New conditions--generated by the regulations of martial law and, above all, by the passport restrictions, as well as the complicated situation in Poland and the granting of exit visas to foreigners--considerably diminished the transport market. In face of the fact that even in this restricted market, the majority of passengers had to be comprised of Polish citizens, our civil aviation officials at the renegotiations with flight authorities of those governments where 'LOT' planes fly, agreed to the principle that in the first period--out of consideration for the restricted magnitude of freight as well as because of the fact that air service is restricted above all in Poland--the Polish 'LOT' Airlines should have the lead in the number of connections and [bidded] freight capacity.

This position was met with the full understanding of our partners in the socialist countries which expressed their consent, so that services would be provided exclusively by 'LOT' planes in the first period. The authorities of national airlines in West Europe approached this matter in various ways. In some nations the opening of an equal number of lines from every side, and even a majority for our partners, was insisted upon. Such an attitude, taken during the time of negotiations, resulted in a delay in the initiation of some of the lines.

The issue of the air route between Warsaw and New York demands a full discussion. In the first days of December 1981, after the negotiations in Warsaw and Washington, an agreement for flights was signed, extending the validity of the past agreement, binding until the end of March 1982. Implementation of this new agreement still required ratification, which--for documents of this type--was, in principle, a formality. After the announcement, by the Polish authorities, of the decision to introduce martial law, President Reagan--in his Christmas address--communicated that, within the framework of restrictions aimed against the authorities of People's Poland, the flight agreement binding at that time is being broken. The Polish-U.S. flight agreement did not allow for the possibility of a one-sided renunciation of it. The decision by the U.S. government, therefore, was illegal. It is worth adding that at this stage, beginning with fall 1981, the service between Warsaw and New York was maintained exclusively by the Polish Airlines [PLL] 'LOT.' The U.S. carrier Pan American, because of the small loads and considerable financial difficulties, suspended its flights on those routes toward the end of 1981.

As a result of the breaking of the flight agreement by the U.S., approximately 25,000 passengers with valid 'LOT' tickets for a return to the country [Poland], were left in the U.S.--without any possibility of using the tickets.

The most convenient connection for those passengers became the route through Montreal. This, however, involved the need to fly from the U.S. to Montreal, to travel there from one airport to another as well as, frequently, to wait for a free seat. Because of the suspension of flights to the U.S., the 2 existing weekly services on the route between Warsaw and Montreal became

insufficient. However, the Canadian airline officials, probably under pressure from the U.S., objected to an increase in the frequency of flights.

By reason of the considerable losses by the PLL 'LOT' and the PRL citizen--suffered as a result of the illegal, one-sides decision by the U.S. authorities--[we] acted on this matter through channels of international arbitration.

In other NATO countries as well, our air carrier encountered certain restrictions and barriers.

Despite these difficulties and the initation of 'normal' air service practically only in the summer season, the 'LOT' carriers can be acknowledged as satisfactory in 1982 and, in the second half of the year, as even promising. Admittedly, the comparison of numbers representing activity in 1979 and 1982 indicates a drop of an average of about 55 percent however--under the circumstances of the complete entanglement of exceptionally unfavorable conditions and facts--the results obtained by the PLL 'LOT' in the past year is evaluated as relatively good.

PLL 'LOT' transported in 1982, according to still incomplete figures, over 907,000 passengers; of this, 473,000 were on international routes and 434,000 on domestic routes. The considerable utilization of passenger space--over 75 percent--deserves stressing. This high utilization of transport capacity also was reflected in the financial results. With general costs exceeding 8 billion zlotys, 'LOT' secured--according to the initial estimates--an accumulation in the amount of about 1.8 to 1.9 billion zlotys.

A significant drop in transport forced the management of the enterprise into many economizing moves. One of these was the reduction in the number of workers; the reductions affected even flight and ground personnel. The outcome of the second half of 1982 and prospects for 1983 resulted in that these reductions, among the flight personnel above all, were suspended. It should be emphasized that the establishing of flight cadre is a lengthy and very costly process. Within the framework of economizing, the staff in offices abroad were substantially reduced, maintaining them only to the extent that is essential to keeping them in operation.

Also undertaken were steps that were aimed at modernizing and standardizing flight equipment. The IL-62 as well as TU-134 planes were sold back to the Soviet suppliers. Gradually, as freight increases, the IL-62M and TU-134A planes--more modern and more economical in use of fuel--will be introduced in their place. The IL-62M plane--in comparison to the older version of the IL-62--uses about 1 ton of fuel less per hour of flight. With the high prices of fuel as well as its major part in direct costs, these savings are worthy of notice.

Economic reforms coming into force did not introduce essential changes in the activities of the Polish Airlines 'LOT.' For several years, 'LOT' had already profited from the great amount of economic self-dependence. The law on state enterprises did not include 'LOT.' It is still awaiting a separate

legal regulation, making allowances for all of the provisions of the air carrier. A very urgent matter for the economy of 'LOT' is the establishement of laws of foreign-exchange financing for carriers. Discussions on the solution to this complex problem are going on in concerned circles. It is essential that a solution, which would contribute to the increase of interest in transport by the enterprise 'LOT' and the procurement of foreign-exchange and, on the other hand, which would protect the interests of the state, be found.

A different problem demanding solution is the creation of conditions which would avert the slipping away of freight and thus, of foreign-exchange also, induced by the hiring of foreign carriers--by Polish enterprises--for transport. This applies to tourist, fishing, as well as foreign capacity of 'LOT' are, in an inadequte way, in compliance with and regulated by the endorsement of international trade agreements. With this type of agreement, the affairs of the national economy demand the introduction of a clause on the transport of people and freight with the equipment of our air carrier. Oversights in this later generate difficulties in the organization of those transports, and even result in attempts at applying restrictions against 'LOT,' which we already have frequently encountered.

In domestic transport, after the introduction of price increases for railroad and bus tickets on 1 January 1983, it is still difficult to assess the effect of these decisions on the seating capacity of the planes and on transport needs. An inevitable slight adjustment in the price of airline tickets is also forecast. The assurance, in this period, of privileges for the Polish Airlines 'LOT,' which should form the supply of these transports as the demand increases, seems fair. Administrative restrictions on domestic transports by alloting, for example, fuel, would be aimless. The alloting of freight in this way, to a large degree through the covering of costs with receipts, would by an activity against the principle of the reform.

What kinds of prospects await 'LOT' in 1983? The second half of 1982 brought a distinct improvement in air transport, which allows a fairly optimistic outlook for the current year. It appears that an increase in the freight operations of 'LOT' by about 30 percent and in the number of passengers by even 40 percent will occur. The restoration of the Polish Airlines 'LOT' to those routes on which traffic has not yet been resumed since its suspension, e.g. to Helsinki, is being contemplated. A plan to begin service again to the Indian subcontinent and to the Arab Gulf is being considered.

Basic indices of Polish Airlines 'LOT' transport operations in 1979-1982, and the schedule for 1983

Type of transport	1979	1980	1981	1982	1983 schedule
Total number of passengers [in thousands]	1,993	1,828	1,711	907	1,224
Of this:					
Foreign flights	1,131	1,037	998	473	628
Domestic flights	862	791	713	432	598
Total transport operations [in million tkm]	263.0	257.8	236.3	112.4	146.9
Of this:					
Foreign flights	235.9	232.8	215.0	99.4	129.4
Domestic flights	27.2	25.0	21.3	13.0	17.5

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ROLE OF SCIENTIFIC RESEARCH IN INDUSTRIAL DEVELOPMENT

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[Article by Mihail Florescu, minister state secretary, National Council for Science and Technology: "Scientific Research--The Basis for Romanian Industry's Modernization"]

[Text] Socialist industry's development process, whose initial phase is the nationalization of the principal means of production, can, of course, be analyzed from a number of different perspectives. This is true because of its own complexity, our country's dynamism and specific conditions and its numerous links to the economy and society's other spheres. However, regardless of how one approaches it, there is one incontestable fact: that together with the creation of a strong industrial base, the national research potential was developed. This was accomplished by establishing and expanding new enterprises, by training a new contingent of highly professional cadres and by increasing the material and financial allocations to these spheres of activity.

This is not a matter of parallel development--of industry, on one hand, and scientific research on the other--but of an integrated development in line with the view of science's role as promoted by our party and its secretary general. Science's role is seen as assuring the progress of production forces and providing a modern and efficient economic structure in the capacity and even the mission of the new order to liberate and to benefit from the nation's creative resources. "Science holds a position of fundamental importance," the party's secretary general, Comrade Ceausescu, has pointed out, "in the work undertaken by the Romanian people to transform society on a new, socialist basis, and to create a modern and prosperous economy and culture." Our state makes a special effort to firmly support scientific research, to create the necessary material conditions for successful scientific creativity and to assemble and train the largest possible number of researchers and scientists, because we are convinced that this represents a sine qua non for Romania's own progress."

An Advanced Perspective Regarding the Link Between Science and Production

In analysis along the lines described above, one can clearly see that some of the industrial underdevelopment in the years before the establishment

of the socialist order in our country corresponded to a reduced level of national scientific research. Thus, if we were to characterize, even summarize, the level of scientific research in private industry prior to 1948, we would have to point out that it was below the growth rate of the national economic sectors. Their development demands were met principally through equipment and machine imports. Frequently in the past, the creative spirit of talented men--which our country has never lacked--did not find the understanding required to carry out their bold ideas. Hence, the establishment and development of Romanian schools in various scientific and cultural areas, whose reputation gradually spread abroad, was achieved mostly by linking scientific research and higher education. Scientific research took on an essentially fundamental character, with less emphasis on practical applications. During the years of socialist construction, scientists and researchers, profiting from a stimulating environment, from performing work, and starting out with all the valuable accomplishments in their domains, advanced the traditions of national scientific research and obtained important results which contributed to the country's economic and cultural progress and to the enhancement of Romanian science's prestige abroad. Starting in 1948, immediately after nationalization, the first technological research and development institutes were established and placed under the industrial ministries that had been created. The nuclei of these institutes were composed of the existing collectives in higher education and the experienced engineers who worked in industrial enterprises. These institutes developed in step with national economic growth.

Aware of science and technology's important role as a productive force in developing the national economy, the Ninth Party Congress decided to join these activities to various production domains in industry, agriculture, transportation and so on. Holding a central place in Comrade Nicolae Ceausescu's profound conception of the vital problems of socialist construction, this concern to continuously develop scientific research's material base, train specialists and more extensively apply the fruits of research is based on a vigorous, materialistic-dialectical analysis of the objective requirements rapid progress. Scientific research is strongly rooted in our country's current conditions; it strives for high returns from all resources by maintaining a balance in the development of national industry, agriculture and other sectors.

The exceptionally important political orientation set forth by the party's secretary general at the ninth Congress--according to which the introduction of technical progress in Romania will be based primarily on our own scientific research and not on license imports--has yielded, with the participation of science and technology along with other forces of productivity, some exceptional results in the Romanian economy. Thus, in the period following the ninth Congress, national income has grown four-fold, industrial production six-fold, agricultural production has doubled and foreign trade has grown by 900 percent.

The Stages of a Strong Advance

To accomplish the tasks of research and development in accordance with established priorities, the technical-material base of science and technology

has grown considerably in this period. If in 1965 there were 50,000 people in research, in 1980 this number had grown to over 200,000 and by 1985 it is expected to reach 245,000. Fixed assets grew 4.5 times between 1965 and 1980 and research expenditures from 5 billion lei in the 1961-65 five-year plan to over 46 billion lei between 1976 and 1980. This will increase to approximately 70 billion lei during the next five-year plan.

Due to the development of the research institute network and quantitative and qualitative increase of people in research--reflected in the increased contribution to general progress--the National Council for Scientific Research was established in 1965. It is a central organization and its highest priority is the management and coordination of scientific activity in our country. As a part of this coordination, the unitary program for scientific research for the period 1966-1970 was drawn up, closely tied to the state plan directives to develop the economy. This represented a truly qualitative leap by involving scientific research in the vast activity developing national industry. During this period, the network of scientific research centers was set up and improved by establishing new centers and developing existing ones, all subordinate to the Academy of the Socialist Republic of Romania, the economic ministries and other central organs. This ensured the link between science and production's primary needs, and produced important results in coal, mineral and petroluum extraction, metallurgy, chemicals, agriculture and machine construction.

The five-year plan that followed 1971-1975, was an important period of organizational consolidation and of growth in scientific research and technological developments' contribution to national socio-economic development. This was achieved by applying the results obtained in research and development prior to and during this five-year plan to current production, and over 5500 machines, tools and facilities were introduced into the production process. Similarly, 238 new methods were applied and over 2400 materials and consumer goods introduced. During this period, patents were granted for more than 6700 inventions.

Scientific research, technological development and the introduction of technical advances between 1976 and 1980 (the five-year plan of the technical-scientific revolution) greatly contributed to modernizing production in all branches of the national economy, and to increase efficiency in all economic and social activity. During this period over 10,300 new kinds of machines, tools, devices and facilities were implemented, over 5100 new materials and consumer goods and over 9000 new, modernized processes introduced. The contribution of research groups is indirectly reflected in the percentage of new and modernized products--47 percent of national manufacturing's value of produced goods.

Concurrently, we were devoting particular attention to introducing and expanding production's mechanization and automation and to bringing computer technology to the economy. In this five-year plan, scientific research itself provided over 90 percent of the new processes and technologies put into production, a major portion of which is in machine construction and chemical industries.

Together with introducing the fruits of scientific research into production during this period research began in nuclear physics, mathematics, biology, public health and so on. During the five-year plan, 12,000 inventions were patented. To assist research, development and technical progress, funds allocated for on-going activities and for investments were 87 percent higher in the past five-year plan than for the period 1971 through 1975. Also, the number of workers in this domain grew to about 200,000 in 1880, 71,000 of whom have had higher education. This represents a 30 percent growth in the number of personnel and a 13 percent increase in those with higher education, compared with 1975.

Also during this period, work continued to improve research leadership and organizational structure. Thus, all scientific research, technological development and technical progress implementation is now coordinated and directed by the National Council for Science and Technology, the deliberative and broadly representative party and state organ. Of particular importance in the council's organization was the decision made at the National Council for Science and Technology plenum in June 1979 in which its leadership was entrusted to Comrade Academician Doctor Engineer Elena Ceausescu, eminent scientist and world famous scholar.

Economic Priorities--Fundamental Objectives of Research

For 1981 through 1985--the five-year plan of science and technology and of quality and efficiency--the tasks for workers in scientific research and technological engineering were specified in "The Program--A Directive for Scientific Research, Technological Development and Introduction of Technical Progress, 1981 through 1990, and Outlook for the Year 2000" and in "The Program--A Directive for Energy Research and Development for the period 1981-1990 and Long-range Directives through the Year 2000," which were adopted by the twelfth Party Congress. These programs have the following major objectives: To increase the direct contribution of scientific research to the resolution of all problems connected with the achievement of plan provisions for Romania's socio-economic development during the five-year plan 1981-1985; to provide the necessary technical solutions to implement the directives for the 1986-1990 five-year plan; to further increase science's role in the overall effort to construct socialism and to prepare the reserves of scientific discovery and technological solutions needed for our country's long-range development through the year 2000.

Elaborated under the direct supervision of the party's secretary general, these programs are to make an essential contribution to the fundamental objective of creating a multilaterally developed sccialist society and of moving Romania ahead toward communism. According to the provisions in these program documents, scientific research in our country must provide sustained development of our own energy and raw material base, better use of our national energy potential, our employment of new energy sources, development of reduced energy consumption technology and intensification of the modernization of industrial production and agriculture. Basic research has an important role, to provide the solutions to some of the complex problems of

the country's socio-economic development in future decades and the development of basic theoretical research in mathematics, physics, chemistry, biology, medicine, agriculture and other areas.

Throughly study of the general characteristics of scientific and technical progress in Romanian society's historical conditions, Comrade Nicolae Ceausescu has made a new, major contribuiton to the development of the theory and practice of building a new society. Referring to scientific research's increased contribution to promotion of technical progress, and to the increase in labor productivity and economic efficiency, President Ceausescu said the following in the report to the national party conference 16 to 18 December, 1982: "To complete the very important tasks in upcoming years, to develop the country economically and socially, this demands sustained scientific research and education, a stronger concentration of the research institutes' workforces to solve the technical and technological problems facing enterprises and the national economy, improved technologies, reduced consumption and improvement of our products technically and qualitatively. We have strong teams in all research sectors. We must unite these forces based on complex programs, and work decisevely to more expeditiously solve the problems faced in every area of activity."

Implementation of the objectives and tasks established in the scientific and technical domains for Romania for the period 1981 through 1985 and over the longer term 1990 to 2000 will contribute to the sustained growth of the national economy, to the bold assertion of the technical-scientific revolution in all areas and to new socio-economic, quality. This will ensure a growth in national income and in the material and spiritual well-being of all our people.

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